The Builder.

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On the Superficial Remains of Ancient Jerusalem.

THE work commenced at Jerusalem opens up a field of archæological discovery hitherto entirely untouched, and can only be compared to the exhumation of Pompeii, the extent of the ruins, if fully explored, being probably much greater, though their state of preservation may not be so perfect.

The actual work done is not, perhaps, great as yet, and an obstacle almost insuperable exists in the fact that a modern city stands above the most interesting part of the ancient town, so that in this quarter nothing can be done, at least at present; but still a considerable portion lies without the walls on the north and south, and it is here that Lieutenant Warren has commenced his work, and already made some progress in it. It is not, however, the amount, but the nature of the work which is important. It has been known for some time past that the whole of the present level of the site of Jerusalem is artificial. Drs. Barclay and Robinson have pointed out those mounds of rubbish varying in depth, and sometimes attaining to 60 ft. or 70 ft., which cover the entire surface of the two hills on which the modern city stands, as well as those belonging to the same plateau on which, as is admitted by all, however different their ideas of its extent and boundaries, the ancient city was situated. It has also been found that the soil consisted principally of a fine limestone *débris*, and resembled in character the *débris* formed by the disintegration of limestone masonry, and that the outline of each of the hills resembles rather that of a gigantic rubbish-mound than the natural outline of a limestone range, as exemplified in the Mount of Olives and the chain of Neby Samwil, in the immediate vicinity of the city.

And yet, although whenever, either by design or during the execution of some independent undertaking, this artificial surface has been removed, in every case some relic of the ancient city has been found, the top of an arch or wall, or the upper part of a tower, still it never seems, until quite lately, to have struck any of the writers on the subject, or of the more practical explorers who, during the last fifteen years, have done good service by describing minutely those few remains which still appear above the surface of the ground, that beneath it lay an extent of ruins equal in interest and preservation to those of Pompeii, and sufficient, when coupled with the minute descriptions of the Old Testament and Josephus, to lay at rest at once the controversies which have so long been carried on concerning the extent of the city, and the position and character of its principal buildings.

The first blows of the sapper's pickaxe have demolished one stoutly-contested theory, that of the course of the southern wall of the city, which nearly all the writers on the subject have agreed in bringing so far north as to reduce the city to an extent about two-thirds of that positively given by Josephus, and have established two important facts,—first, that the extent of the ancient town on the south was much greater than it is at present, and covered the whole of the hill of Zion, the modern wall running nearly over the crest, a course which cost the Arabic architect his life; and secondly, that, instead of the modern level of the Haram, both within and without, being that of the temple inclosure of Herod or Solomon, while the rest of the city has mysteriously disappeared, the whole does in fact exist, but at such a level that it is only the temple inclosure that, owing to its enormous height, can, like the sphynx before its exhumation, keep its gigantic head above the ground.

At such a time, when a new Jerusalem is on the point of being disentombed, when we may say without exaggeration that a long-lost city has been recovered, it will be interesting to describe the few remains which were discovered before the time of Lieutenant Warren, at different periods and by different explorers; and the more so as these remains show a mixture of styles and workmanship which, independently of their special interest, are most interesting and instructive to the architect and the archæologist. The greater part of these exist in the present Haram inclosure, and have been principally described by Dr. Barclay, Robinson, Catherwood, and most especially by the French architect, M. De Vogüé, whose work on the subject is the most important and perfect hitherto published. Much information is also to be obtained from the ordnance survey and the photographs which accompany it, as well as from those taken during the visit of H.R.H. the Prince of Wales.

So much attention has recently been turned to this subject that it is almost unnecessary to give a general description of the city and Haram inclosure; although there are the means of obtaining the most accurate measurements of all these remains, moreover the space occupied would be too great for such a review. A few words of introduction will suffice roughly to fix on the mind of the reader the localities of these relics.

The sketch given* shows the general features of the ground occupied by the city.

It will be seen, then, that Jerusalem stands on a plateau divided from the surrounding country by two valleys, originally of some depth, but now much filled up.

This plateau rises into four principal hills—one to the south, nearly circular, though described by the ancient writers as heart-shaped. Hence the origin of many traditions. This is, at present, the most elevated of the four, though probably the *débris* is thickest upon it. Immediately north of it lies a second, which is considerably lower, and answers, as all writers agree, to the Acra, or lower city, of Josephus. East of this is Moriah, the natural shape of which is entirely lost owing partly to its having been altered by Herod and Solomon, to suit their buildings, and partly to the accumulation of rubbish upon it and in the valley below. Its present shape is roughly that of a parallelogram, with a tongue known as that of Ophel, on the south. This, as well as the other hills, has been accurately contoured.

North of these three hills is a fourth, surrounded originally by the third wall of Josephus, though the exact extent of this wall has not been well determined by any writers. This hill is the Bezetha of Josephus, and, as it is of greater extent, it is also much less elevated than either of the other three.

Such being the general features of the site, two points will be sufficient, together with the outline of the modern city wall marked on the plan, to fix with sufficient accuracy the position of all the remains about to be described. These are the modern church of the Holy Sepulchre on Acra, though no eminence exists there which may be known as Mount Calvary, and the Haram enclosure on Moriah.

The remains in the city are few and imperfect, but those in the Haram are almost intact, and present a jumble of architectures which, commencing with the work of Solomon, go down with the additions and improvements of Herod, to the patchings and ornamentation of Julian and Justinian, the restorations of the caliph Omar and his successors, and the execrable workmanship of the more modern Turkish and Arabic masons. The preservation and wonderful interest of these are points concerning which very little seems generally to be known, and are confined to those who have made Jerusalem a special object of study.

The ruins of the city itself,—that is, of that part hitherto brought to light,—may be treated of in a few words.

The most important of these is a gateway, discovered originally by Robinson, on the site of the present Damascus gate, the position of which is marked on the map. It consists of the foundations of two towers of an irregular shape, built of huge stones of the rebated style, characteristic of the oldest masonry of the city. These towers are built into the city wall, and but little can be seen of them, as modern masonry covers some part of them.

In one, however, Dr. Barclay found the remains of a winding staircase of remarkable construction, consisting of flights of steps at right angles to each other, the size of the stones being proportional to that of those in the walls.

This ruin, more accurately examined by Lieutenant Warren, concerning whose work it is not our intention to speak here, belongs exclusively to the first or rebated style.

Another of almost equal interest is found in the immediate vicinity of the Church of the Holy Sepulchre, at the east entrance. It consists of a wall of large rebated stones, the foundation being broader than the upper part of the wall, and a pier or buttress projecting from this, flush with the face of the foundation. The recess is not made with a horizontal step, but is sloped off with a course of stones, the face of each block of which recedes at an angle of about 45 degrees.

A precisely similar construction is visible in the wall of the Haram at Bethlehem, in which the whole wall consists of large rebated masonry, like that of Jerusalem.

A third ruin stands a little south of this, consisting of a plain wall of large cut stones, like those of the second style of the Haram enclosure. In this an archway is cut, with a semicircular arch, and two pilasters of different styles. The arch consists of stones of much smaller size than those of the wall, and is evidently much more modern; each capital of the pilasters is cut out of the blocks of the old wall, one being of Romanesque character, with a bird introduced into the tracery, the other having the peculiar basket-work tracery of the Byzantine capitals; as shown, for instance, in the Mosque of St. Sophia, and elsewhere.

It is also worthy of notice that the courses of stones forming the shafts of the pilasters are not continuations of those of the wall, although of equal size, the horizontal joints not being flush, and several smaller stones being patched in between the pilasters and the wall, as well as round the keystones of the arch, in a clumsy and most inartistic manner.

These two remains were first described by M. de Vogüé, who gives plan and elevations of both to scale. They are most interesting as bearing on the disputed point whether the present Calvary was or was not within the walls

* See p. 174.

of the ancient city, and seem to show from their position east of the present church that both the walls of Nehemiah and of Herod excluded the traditional site of Calvary. The first of these ruins forms part of the entrance to the basilica of Constantine, as restored, apparently with certainty, by M. de Vogüé. From this fact Dr. Robinson thought that he traced the marks of a wall running north, but there seems to be some doubt as to the true character of these indications.

On the southern slope of Zion another ruin exists, consisting of a small square tower with a wall of the second or unrebated megalithic style, and with a fosse. This, with a cistern containing an arched reservoir, completes the list of the few remains of the city itself found before the commencement of Lieutenant Warren's excavations. No account has, however, been taken of the square tower situate at the Jaffa gate on the east wall just above the northern side of Zion, as, although the stones of its walls are rebated, still their very small size as compared with the immense blocks of 40 ft. found in the Temple, together with a want of finish and difference in material, is opposed to the assumption of many authors that this work is the Hippicus of Josephus.

Besides these remains there exists a second class, namely, the tombs around the city. Of these there are two groups, and the date of them is a matter of considerable interest.

The first of these is the so-called Tombs of the Kings, which exhibits the true Jewish character as shown all over Palestine. The principal feature of these is a square rock-cut chamber, communicating by narrow passages with other similar chambers, which have niches or cubiculi placed lengthwise at right angles to the walls, three cubiculi being the most in one side, and two or three being placed directly above one another: thus the total number of cubiculi in one chamber, allowing for the passage occupying part of one wall, would be at the most about thirty, and at the least about half that number.

The chambers in this set of tombs are numerous, and arranged in two stories; but they are all of the same character, and this is entirely different from that of any Roman sepulchre, and also from that of the traditional Holy Sepulchre. The entrance to the hall from which the passages radiate is through a small door, communicating with an excavated outer hall, which has an open entrance from the large sunken court which surrounds the opening. Part of this outer hall has its floor level with that of the court without, but the other part is level with the floors of the first story of the excavated apartments. A narrow channel is cut in between the face of the wall, in which the door leading to the inner hall is cut, and the higher part of the floor of the outer entrance. The bottom of this channel is not horizontal, but has a sensible incline, so arranged that a large cylindrical block of stone might roll along it, and when in its lowest position cover the entrance not closed by any other means. When this block was rolled to its highest position the door was open. This construction beautifully illustrates the passage in the Gospel, in which the rolling away of the stone from the door of the sepulchre is mentioned.

Above the broad entrance of the outer hall is an entablature, which has been a puzzle to many archæologists. Its general character is similar to that of the Tombs of the Judges, not far distant, but it is more ornamental. In the latter instance, not only is the internal arrangement of the true Jewish character, but the outer face of the rock is channelled in imitation of the rebated masonry, the blocks represented being megalithic, and from the appearance of the entablature it would seem to be of the same date,—that, namely, of the Jewish kings; but in the tombs in question no such imitation exists, and therefore there is nothing particular to fix the date.

The entablature represents wreaths of laurel, bunches of grapes, and various figures resembling a Y formed of small round globes, perhaps representing grapes, the whole divided by triglyphs, with guttæ of Ionic character, and bordered above and below with a band of leaves. Three pilasters cut in rock appear to have supported this curious entablature; but they have entirely disappeared, and the whole is considerably damaged and broken.

The entablature has been accurately photographed, and the tombs explored and planned.

The second group of tombs is in the Kedron valley, south of the Haram, and on the opposite side on the slope of Olivet. Of these the principal are the so-called tombs of Absolom and St. James, traditional names to which monkish legends are attached. The tomb of Absolom is a square monolith, with an excavated chamber at the top, and surrounded with Ionic pilasters supporting an entablature from which springs a dome almost Saracenic in character, the whole partially buried, and resembling the curious rock-cut tombs of Petra, in Arabia Petræa.

The tomb of St. James or of Jacob is a rock-cut sepulchre, more resembling the sepulchres of the kings, with an entrance supported on apparently Doric columns, with an inscription in square Hebrew, very imperfect, attributing it to three Jewish brothers, priests, and to two of their nephews. The style resembles that of the Palace of Hyrcanus, and is supposed by De Vogüé to be of the time of Herod.

Such are the remains in the city itself; but those of the temple are far more numerous and interesting.

The Haram enclosure has of late been often described; and, having been repeatedly measured, though with different results, it will be sufficient to say that it is an enclosure of which the south wall measures about 900 ft.; that on the east, which is at right angles to the first, about 1,800 ft.; and the northern about 1,000 ft.; while the western wall, as shown by Catherwood and the Ordnance survey, was at right angles to the south wall for some way, but, when past a certain place, about two-thirds of its length from the north, known as the Jews' Wailing-place, it bends towards the west and joins the north wall at an acute angle. This latter part seems to be modern.

The interior of this enclosure is considerably elevated above the present exterior level, and covered partly with soil and trees,—partly with flags of limestone.

In the centre, on an irregular trapezoidal raised platform, stands an octagonal mosque of large size, known as Kubbet es Sacra, or the Mosque of Omar. In the centre of this stands the curious hollowed stone which Mr. Fergusson, supposing that the whole of this enclosure is not really ancient, has considered to be the traditionary Holy Sepulchre of the time of Constantine.

On the south wall, about a third of its length from the west end, is another large building, now a mosque, but originally a Christian church, built by Justinian and augmented by the Crusaders, the three styles being mixed together, but easily separable. This is the Mosque of El Aksah.

The height of the interior walls, as measured before Lieut. Warren's excavations, was about 60 ft., and 70 ft. at the south-east corner, where the rock was lowest; but he has now excavated to a depth of about 130 ft. below the top of the wall.

Of the masonry, of which these wonderful fortifications are composed, something has been said in the pages of this Journal, and a more minute description given than is here possible. It is sufficient to say that below the more modern Arabic patchwork two dissimilar styles are to be remarked all round the enclosure.

The first consists of gigantic stones hewn vertically from the limestone, which is of a kind hardening with exposure to the atmosphere, without regard to the character of the bed, soft and hard veins being used indiscriminately, and thus the wall presents an irregular appearance, owing to the different amount of weathering of the different blocks.

The upper courses are sometimes deeper than those below, and the joints and the lengths of the stones are very irregular. Those discovered before the investigations now commenced, were all marked with the peculiar ornamentation of a deep rebating, improperly described as bevelling, which runs round the four edges of the face of the stone, and gives a kind of ornamentation to the face of the wall. The stones since discovered are said to be more roughly worked, the face being uncut, while the former were even polished.

The size of these stones is very great, many being as much as 40 ft. in length and 10 ft. in height. The largest were at the south-east corner, and some in a very good state of preservation. This style is found running round the entire length of the wall on the south-east and that part of the west on which no new buildings have been raised against the Haram walls. The position is always below the stones of the second style. On many of the stones there are small square blocks placed irregularly on the face, which are supposed to have been used by the builders to attach ropes by which each stone, when finished, was slung, and being moved on rollers up the floor of the cavern (still found with a gentle slope), to have been transported by means of a great number of crossbars, which allowed the distribution of the weight over a large space, and facilitated the transport by a large number of men or beasts. The quarries themselves afford much interesting information, and give many valuable indications of the mode of workmanship and means of transportation used by the builders of this first period. They have been fully explored and described by Dr. Barclay.

The second style shows considerable advance in masonic skill. The stones are nearly as large and more regular in jointing and length; they are not marked by any rebating or other ornamentation, being plain and rather square, resembling the Roman megalithic masonry of Herodium.

The large stones ascribed to Justinian do not equal any of these stones in proportions; and although of a fair size, are decidedly not megalithic.

The principal points of interest on the walls of this extraordinary enclosure (for of the interior we know hardly anything as yet) are the Jews' Wailing-place, Robinson's Arch, and the Single, Double, Triple, and Golden Gateways. Above ground not a single relic remains of the ancient Temple, and the whole of the present surface is covered exclusively with work the most ancient of which only dates back to Justinian. Beneath, a few vaults remain; but it is worthy of notice that every one of these is built up at the end: so that if it were not for the inflexible opposition of the Mahometan possessors, it is most probable that many interesting relics might yet be found in the heart of the mountain.

A disconnected work of great importance has also been visited by Dr. Barclay, namely, a very large reservoir, with a roof supported by rock-hewn pillars, bearing marks of having been originally covered with metal. This reservoir is placed centrally with regard to the east and west walls, and about three times as far from the north as it is from the southern wall. It communicates with the Brook of Kedron, and with seven other reservoirs or wells. It can at present be only reached from the interior of the Haram.

The Jews' Wailing-place, a well-known spot to all who have read any works on this subject, is a portion of the western wall, forming one side of a narrow street. It is here that some of the largest stones are found, both of the first and also of the second style. It receives its name from the practice of the Jews of assembling here once a year to lament the dispersion of their race and the ruin of their city, as they sit on the ground, tearing their clothes, casting dust on their heads, and often placing them in large weathered hollows between some of the lower stones, in which position they often remain lying for some considerable time. The stones here are much weathered, and some almost destroyed.

The arch, which is known at the present time by the name of its discoverer, Dr. Robinson, appears to have formed the communication between the Temple and the city on the south-west; and it is interesting to observe that, taking the longer cubit, as generally determined in English feet, both the breadth of the arch and its distance from the south-east corner, as determined by the Ordnance survey, are such as to make it a continuation of the central cloister of Herod's Temple, the dimensions of which are given by Josephus; this cloister being of different dimensions to those on the north, east, and west, and known as the Stoa Basilica. In this view Mr. Fergusson and many of the best writers on the subject agree.

Of this arch but a trace remains at present. It appears to have been semicircular, and sufficient is left to make the restoration of the span possible, following which indication Lieut. Warren has been able to find a pier of the bridge on the opposite side of the valley, which, even above the present surface of the ground, shows indications of the springing of another arch. The stones of which it is composed are of larger size than those in the wall, and one only forms the thickness. They are not rebated, and are said to be held by tenons into the wall, so as to stand still, though unsupported by the piers. The arch springs directly from the wall, a little above the present level of the ground.

The four gateways mentioned above are by far the most important and extensive remains as yet discovered, and present a jumble of styles from a time before that of Solomon down to the present day.

The Golden Gateway is on the east wall, at a distance from the north-east corner rather less than a third of the length of the wall. It consists of a gate-chamber, whose floor is on a level with the outer ground beneath the Haram wall, some 20 ft. from north to south by 80 ft. from east to west. It is double, and has a double-arched entrance, now filled up. The roof, which reaches a height of about 30 ft., is supported on two pillars and two piers with half pillars, while four pilasters on the north and south walls support four cross arches. Above these transverse arches are six domes with pendentives, of which the two nearest the east are raised to a greater height on drums, and furnished with windows for lighting the chamber, otherwise closed. Above the thickness of the entrance is a tower, which is about 60 ft. in total height.

Here, then, we have a most curious mixture of styles. The domes, drums, and arches are all of modern workmanship, and may be of any date later than Crusading times. The two central pillars are undeniably Byzantine, with the usual heavy capitals and bases. The pilasters on the walls, and the richly-carved entablature which they support surrounding the room on three sides, are of fine Romanesque work, beautifully cut and ornamented to an extent which marks the latest and more degraded Roman style. They are merely ornamental, and do not enter into the construction of the room. The same style of work is observable without, but here the entablature is bent into arches above the entrance, these arches starting from pilasters on each side and in the centre of the gateway. The same ornamentation is found on the outside of the north and south walls, and another double entrance leading to the Haram enclosure. This transition style, occurring also in the Golden Gate of Spalatro, has been pointed out by Mr. Fergusson as belonging to the fourth century, about the time of Constantine,—a fact which he seems to prove by architectural evidence,—thus making it probable that there are remains of the work of Julian the Apostate, who commenced the rebuilding of the Temple.

It will be worth while to remark some of the details as they recur in another doubtful relic. Among the principal are small deeply-cut dentels, scroll-work with square projecting blocks as the centre of each flower, a larger kind of dentel often found in immediate succession to the smaller kind, and many other nameless ornaments sufficiently characteristic of the style.

But the confusion does not stop here. The piers and walls of the apartment are of enormous stones, of the second style, in a good state of preservation; and, although no masonry of the first style occurs, yet the projection of the lintel internally at the east entrance is formed on each side of two enormous blocks of solid stone, some 20 ft. in height, which have been channelled horizontally so as to represent two or three courses of this masonry. These are unquestionably of greater age than the first style, and must be of enormous antiquity, if we suppose the rebated masonry to be of the time of Solomon. But a fuller comment on this ruin has appeared at some distance back in the numbers of this paper.

The Single gateway is on the western wall. (This name is that by which it was known before Lieut. Warren in his investigations had discovered another vaulted entrance on the south, to which he gave the same name.) It consists of a single passage, about 20 ft. wide, the sides lined with small stones, and walled up at one end, its total length being about 300 ft., and the height to the centre of the vaulted roof about 20 ft.

The entrance is most remarkable, and externally it is made of an enormous lintel, resembling that at the Gate of Lions at Mycenæ, supported on the wall on either side without any kind of pier. All the stones up to the level of the top of the lintel are rebated, as is also the lintel itself. Its height is double that of the course of stones, and the joint is broken by the prolongation of the lower half of the lintel on either side as at Mycenæ. Above the lintel stones of the second style occur, though of comparatively small size. Internally a very flat relieving arch, or, more properly, a second lintel, slightly curved, is built of five stones of enormous size, and of the second style, a method of taking the weight off the old stone observed in other parts of the Haram.

The Double and Triple gateways are at an equal distance from each other, and form the south-west and south-east corners of the wall. The Double gateway is the double in all its dimensions of the Single gate, and was first discovered by Mr. Tipping, who, observing part of an entablature and a grated window, beheld within a large vault, hitherto unexplored; the entrance being covered by modern Arab houses, into which he managed to effect an entrance.

In order to make out any order from the confused mass of ruins and patchwork now existing, it is necessary to begin with the oldest work and proceed to the latest. Of the rebated masonry the remains are perfect. The entrance at that time consisted of a double doorway, 40 ft. wide, with a central heavy pier, on which and on the ends of the two walls the lintel, similar to that of the single gate in form and size, rested. The remains of the second style consist of two low relieving arches in the wall above, taking the weight off the lintels, one of which is cracked across. The walls of the chamber within are also of the second style, with plain Doric pilasters; though there are marks, according to Mr. Tipping, of these stones having been cut down to afford relief to the shafts of the pilasters, traces of rebating being still visible.

Before speaking of the more modern alterations of this simple plan, it will be necessary to give some description of the interior passage. This consists of a room of equal width with the doorway, and about twice the length; being divided by arches, resting on pilasters and three pillars, into four compartments, capped by flat domes with pendentives.

These domes are, however, of very different character to those of the Golden Gate, being composed of large stones and ornamented in a manner foreign to any known style of architecture. The principal feature, besides numerous wreaths of corn sheaves, being a large and irregularly-traced vine, with bunches of grapes, which runs in low relief over the whole dome, and over this are four squares, surrounded with a raised frame, placed on their corners, and filled with various kinds of ornamentation, one being of rose and coffer work, another of intersecting arcs, in high relief. The pendentives are also of a similar character.

The central pillars on which these curious domes are supported are themselves of a unique description. They are both of monolithic shafts and without bases. The more southern has a capital, the outline of which is of an unmistakeably Egyptian character, consisting of a bell covered with acanthus-leaves traced in the very lowest relief, with lotus-leaves appearing between the divisions, the whole capped with a thick abacus. The only capital of similar description is found in the Tower of the Winds at Athens, and even this is of a much more decided character; yet it is from this that Mr. Fergusson has deduced the Egyptian origin of the Corinthian style. The second pillar has a plain bell-shaped capital with abacus, resembling the former in profile, but unornamented. The second pillar is placed at the foot of a flight of four steps, apparently ancient, which occupy the half of the passage to the west, while to the east of the pillar a wall of rebated masonry forms the end of the hall.

Mounting by these steps, a vaulted gallery raised some feet above the hall is reached, being divided centrally by a row of piers supporting arches,—the whole of smaller masonry, though still of a size larger than usual. The walls are megalithic, and therefore of a different age to the piers, being of the second style. The passage is blocked at the end, but communicates by steps with the interior surface of the Haram.

The present appearance of the gate, as seen from without (the houses built over part of it being removed), is further complicated by the addition, for ornamentation, and in a manner not at all connected with the construction, of an archway resembling a T in shape; the lower side of the entablature being arched out into a double arc, and the line running horizontally above. The whole ornamentation running round this peculiar form is similar to that of the Golden Gate, the same details being observable as spoken of above, and the same order retained. Above this double arch, and at some height on the wall, disconnected from the lower work, and immediately surmounting the relieving arch, is a narrow cornice consisting of two rows of dentils and a moulding which stands out as a string-course from the wall. There can be little doubt that these added ornaments are of the same date as those on the Golden Gate.

Close to the last-named detail is a curious stone, in size equal to those surrounding it which are of the second style, but bearing an inscription and built reversed into the wall. The time of the inscription is Hadrian's, and it runs as follows:—

"Tito Æ[lio] Hadriano
Antonino Aug[usto] Pio
P[atri] P[atriæ] Pontif[ici] Augur[i]
D[ecreto] D[ecurionum]."

The Triple gate is built on exactly the same plan, and finished in the same method by Herod, with the exception that it is triple, and leads to a rock-hewn passage, and that no ornamentation exists on its pillars, face, or roof. To the east of it are a series of vaulted passages, irregular both in width, length, and height,—a series of arches, supporting a vaulted roof, the piers being formed of large stones, apparently taken from the walls, and rebated on one side, while on the other three they are roughly rusticated. Thus they appear to have been made use of after having been taken from the wall, and the whole system is considered to be modern.

It is under these that Lieutenant Warren has just discovered his Single gate, which appears to be undoubtedly ancient.

Although this system of vaults, which has been accurately planned and measured, is apparently modern, there exists at the extreme south-east corner a chamber investigated by M. de Vogüé, which is of similar character with those remains already described. It consists of a roughly-squared room, with a window having a triple opening to the east. The plan of the piers of the window are similar to those of the gateways already described, and in one corner is a winding staircase similar to that in the tower of the Damascus gate. The roof of the apartment is vaulted, and is supposed by M. de Vogüé to be ancient, resembling that at the Double gate.

To the north of the first window, one bay of which is without the wall of the chamber, is another, double, and of the same character. Both of these are at a much higher level than any preceding remains, as is also the floor of the chamber, and seem to have been situate near the top of the ancient wall. On the south side of the chamber is another window, filled up.

Such is a brief description of the few remains which at different times and by separate individuals, have been discovered above the surface of the ground before the work was commenced by Lieutenant Warren. Though few and scattered, they are yet of great value, as showing by their exact coincidence with the description of Josephus, how unexaggerated and truthful his statements are, and how magnificent were those works the immoveable foundations of which we must surely find, if we only seek in the proper place. It would be truly a disgrace if such a scheme were allowed to fall through.

It is probable, that if fully carried out, these investigations will lay at rest for ever the controverted points in the topography of Jerusalem. It would be out of place to draw any conclusions from the facts hitherto collected; still, it is well to have an idea of the tendency of all the evidence, and thus to have some notion of where to work and what to expect. It will, therefore, be well to point out the indications of these remains, with regard to the three temples of Solomon, Herod, and Julian. The similarity of the second style to that of Herodium, together with the semicircular arches and square stones, must seem to all who look without prejudice on these relics to point out the origin, as belonging to the time of Herod, while the inferior position, the Egyptian character of the pillars, and the unusual rebating, together with the absence of the arch, will seem to date the first style at the time of Solomon.

The fact that the transition style limits the Romanesque architecture of the Golden and Double gates to a time between that of Julian and Diocletian, when coupled with the known fact that Julian built on Moriah, would seem to be sufficient to fix the authorship of this work.

Of the more modern works of Justinian and various builders, down to modern times, nothing need here be said, as they admit of no dispute, and are only important when considering another branch of this interesting subject—the Mediæval relics of Jerusalem, a subject which has been most fully investigated, and is of great, though separate, interest.

Such, then, are these relics briefly described,

as is necessary from the nature of such a sketch, but of which plans, photographs, and accurate detailed drawings exist. We must await that fuller and more complete investigation which, with proper men and sufficient money, Lieutenant Warren will be able to carry out.

ON THE UTILIZATION OF SEWAGE BY IRRIGATION.*

On the Methods by which it has been proposed to treat Sewage.

EVER since the arrival of Asiatic cholera and other devastating epidemics on our shores a multitude of schemes for the deodorisation, disinfection, filtration, precipitation, and utilization of the offensive matters held in the sewage have been from time to time in vogue. Few of them, however, have been successful, and by far the greater number may be pronounced to be the nostrums of visionary enthusiasts, with no result save that of useless expenditure of time and money.

The following may be considered the principal of these methods of treating sewage:—

1. Filtration through artificial beds.
2. Deodorisation and precipitation of the organic and inorganic matter.
3. Utilisation by earth closets.
4. Utilisation by irrigation.

1. *Filtration through Artificial Beds.*—The experience of the past twenty years has shown with what favour the theory of the filtration of sewage has been adopted by engineers and public boards. There is hardly a single district of any importance under the jurisdiction of the General Board of Health which has not at some time or other been more or less engaged in attempts to bring this theory into practice. Had a tithe of the energy thus bestowed upon a vain and hopeless pursuit been devoted to the solution of the question of utilization, there can be little doubt that it would have long since been settled to the permanent and solid benefit of this heavily-taxed nation. Amid all these efforts, no satisfactory case can be pointed out in which valuable results have been obtained from the adoption of artificial filter-beds; and it is now generally acknowledged that organic matter held in solution cannot be extracted by filtration. What is extracted is simply the solid matter suspended, that which is in chemical combination being practically untouched.

Sand, gravel, lime, charcoal, animal and vegetable, alum, shale, magnesium, and an indefinite number of other purifiers, have each had their turn; have undergone every variety of combination and permutation; and have invariably met with the same fate. Many of these, indeed, have given good promise when dealt with experimentally in the laboratory, or upon a very limited scale, but, from obvious reasons they have entirely failed when brought to extensive application. It may, perhaps, tend to lessen our professional pride, when we reflect that after the lapse of a generation distinguished for the spread of engineering science, we find ourselves compelled to submit to the sagacious conclusions of our eminent predecessors, after a fruitless attempt to better them.

It is but recently that at Aldershott, the eminent civil engineers who carried out the drainage of the permanent camps, erected near their outfall costly and elaborate beds of prepared lime, &c., through which it was proposed to filter the sewage on its way to the Blackwater. These works may now be seen (1867), a square, solid fabric of masonry, with all the signs of recent erection, silent, and utterly abandoned. It was found, as might have been expected, that the fluid, although by no means freed from its offensive sewage matter, became so charged with lime during its passage through the beds, that in a very short time all the fish for miles down the river were killed, and an injunction from the Court of Chancery was obtained, commanding the Government to stop the works.

At the oft-quoted Croydon, amongst the many schemes forced upon the Local Board by the proprietors of the river Wandle, filtration in every form was tried,† with such results as are recorded in the extensive works which are now rapidly falling into ruin near the site of the present irrigation tanks at the outfall. Mr. Alderman Mechi, in referring to these works, which consisted of vertical perforated iron plates, with layers of gravel or charcoal, said before the Select Committee on Sewage, in reply to Mr. Ferrand, that the filtered sewage "looked like dirty water, and was slightly disagreeable to the smell."*

At Wakefield, the adoption of Mr. Spencer's magnetic carbide filter for the water supply does not appear to have been devoid of success, as there is undoubtedly a material improvement in the water obtained from the river Calder after filtration; yet in the gross and polluted state of that river the removal of an immense amount of organic and inorganic matter in suspension, does not by any means destroy the dangerous condition of the liquid. Even yet, the filtered water placed in a newly-washed decanter throws down a precipitate which presently turns putrid, indicating the noxious presence of nitrogenous matter or ammonia.†

At Rugby, the failure of the filtering process was complete. Mr. G. H. Walker, the lessee of the Rugby sewage, says that the filter-bed did more harm than good, inasmuch as it was always full of putrefying matter, and the sewage flowing through it passed into the river in a fouler state than before.‡

Coventry, Leamington, Leeds, Leicester, Nottingham, Carlisle, Tottenham, Bury St. Edmund's, and other towns have witnessed the failure of artificial filtration to meet its required purpose; and it may now be considered that, with the exception of a few enthusiasts, who now and again intimate to the world that they have at last solved the problem, and discovered the true filtering medium applicable to this purpose, this means of purifying our sewage has been condemned as futile. Concerning artificial filtration, the following clause is extracted from the report of the Committee on Metropolis Sewage 1864:—"No efficient artificial method has been discovered to purify, for drinking and culinary purposes, water which has been once infected by town sewage. By no known mechanical means can such water be more than partially cleansed; it is always liable to putrefy again. Processes of filtration and deodorisation cannot, therefore, be relied upon to do more than mitigate the evil. Water which appears perfectly pure to the eye, is sufficient, under certain conditions, to breed serious epidemics in the population which drinks it." "Soils, however, and the roots of growing plants, have a great and rapid power of abstracting impurities from sewage-water, and rendering it again innocuous and free from contamination."§

The Rivers Commissioners say, that "no arrangements for treating sewage are satisfactory, except its direct application to land for agricultural purposes." ‖

2. *Deodorisation and Precipitation of the Organic and Inorganic Matter.*—As the alchemist of olden time passed his life in the vain pursuit of the philosopher's stone or the elixir vitæ, so in the present age the resources of chemistry have been wasted in the endeavour to extract wealth by the precipitation into a portable and concentrated manure, of the valuable parts of sewage. Enterprises conducted upon a grand scale have been projected with this object, under very eminent auspices, and have brought their promoters nothing but ruinous failure.

The history of the Patent Solid Sewage Manure Company's works, at Leicester, with such names as those of Robert Stephenson and Professors Aikin and Taylor as the chief proprietors, and that of Mr. Wicksteed as projector and engineer, forcibly illustrates the errors into which a too keen enthusiasm may lead men of acknowledged reputation. Mr. Stephenson, although, perhaps, second to none as a constructive engineer in the highest branches of the profession, could scarcely in justice be considered to possess that nice and accurate knowledge of the chemical relations of sewage which unwearied study and practice can alone give; and his engineering colleague, although practised in hydraulic questions, was far too sanguine in pursuit of this theory, as will be seen on reference to his report to the Commissioners of Sewers. In 1854, after a series of satisfactory experiments, works were erected at Leicester by this company for the purpose of precipitating the solid manure in sewage, by quicklime administered in the proportion of 1 in 3,000. The capital is reported to have been 40,000*l.*, and seventeen steam-engines were required for pumping the sewage. Two reservoirs, 200 ft. by 44 ft., were constructed, and over these were erected warehouses, engine-houses, &c. Very hopeful reports were issued by Mr. Wicksteed, and the attention of very high dignitaries was directed to the enterprise, which after an enormous expenditure, collapsed into utter ruin as a commercial speculation, and now is ranked as one of the most signal failures on record.*

At Tottenham, the process of deodorisation and precipitation was tried with the same want of success, the works being now abandoned. The like result has occurred at Bury St. Edmund's, Croydon, Leamington, Coventry, and many other places.

In Paris, some years ago, gigantic reservoirs were excavated at Montfauçon, into which all the filth of that city was conveyed in covered carts, for the purpose of being converted by the action of sun and wind into a solid and useful manure or *poudrette*. The stench from these pools was intolerable, and bred putrid fever in the hospital in their neighbourhood. Since then the Montfauçon nuisance has yielded to a vast system of main drainage, which, as yet incomplete, promises to maintain the eminent reputation which has been gained by the internal government of Paris. The nuisance at Montfauçon, however, did not arise from what is now understood as sewage, *i.e.*, the contents of our sewers in their diluted condition, but from the night-soil, consisting chiefly of urine and excrementitious matter.

We have seen from the foregoing examples, that the verdict pronounced against the sufficiency of all known methods of dealing with the contents of our sewers by filtration or precipitation, is in every sense just and warrantable. Before we approach the discussion of the principles of sewage irrigation, there still remains another important expedient, which, although of all methods the most ancient in use, and one that has never been discontinued, has but recently received the attention it deserves, namely, deodorisation and utilisation by the use of dry earth.

The Dry Earth System of Sewage Utilisation.

The remarkable deodorant action of common black soil in a dry and pulverulent state, upon the ammoniacal steams given forth from the liquid and solid fæces of animals, is a truth which, however it may be casually lost sight of, can be deemed of little less antiquity than the human race itself. Neither has this knowledge been confined to human reason, since the commonest observation tells us that it is shared by the instinct of many animals. There are few country houses of any importance where the domestics have not been instructed to carry out periodically this natural process of deodorisation by the timely aid of a shovelful of ashes. When we hear, therefore, of high church dignitaries declaring the dry-earth system to be the greatest of sanitary discoveries, and of associations of learned men meeting to enlarge upon the singular revolution which is about to regenerate the mind, body, and estate of the whole human kind, we may be permitted to wonder at the want of so ordinary a kind of knowledge. Nevertheless, there can be no dispute that this useful property of earth has, to some extent, fallen into disuse, more especially amongst the humbler classes, who give themselves very little trouble on this score. That this proceeds more from indolence than from ignorance, does not detract from the merit of those who, viewing this matter with due regard to its practicability, would urge its general adoption where, from comparative isolation, or from other natural causes, the ordinary privy cannot be dispensed with.

The amount of popularity, then, which has been acquired by the earth-closet recently patented by the Rev. H. Moule, vicar of Fordington, is by

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* See p. 146, *ante*.

† Amongst other processes tried, were,—filtration through charcoal; Higgs's patent lime process; treatment with carbolic acid and per-chloride of iron. Mr. Latham, Leamington Congress Papers, p. 139.

* Rep. Met. Sewage, 1864: 3365-69.

† Third Report of Rivers Commission. Aire and Calder, 478 and 2,201. The Calder at Wakefield is in a state of extreme pollution, draining in its course thither an area containing 400,000 inhabitants, the whole of whose sewage passes into the river, which, moreover, is polluted in every imaginable form by the refuse of no less than 1,200 manufactories of various kinds. To this pollution, Wakefield, a manufacturing town of 20,000 inhabitants, adds the contents of its own sewers, and the discharge from its own manufactures; and having done so, draws from the stream three-fourths of its own supply (vol. i., p. 46).

In an analysis of the water of the Calder, 1864, Mr. Fowler, surgeon, found five varieties of animalculæ, decaying muscular fibre, constituents of fæces, several varieties of vegetable life, and other noxious matters. This water was at that time drunk by the people of Wakefield, without filtration (vol. ii., p. 18).

‡ Rep. Met. Sewage, 1864: 3728-29.

§ Rep. Met. Sewage, 1864, p. vi.

‖ Third Report, vol. i., p. 65.

* Rep. Met. Sewage, 1864: 4032 and 4902-3. See also Mr. Wicksteed's Report to the Commissioners of Sewers, February 13, 1854.

no means altogether undeserved, although far too much scope in its operation has been claimed by those inflexible enthusiasts who cannot comprehend the impossibility of arriving at a single system which shall equally serve in every case. The details of the scheme contain nothing very striking or original, and it may be briefly and not unjustly defined as a new and systematic rendering of a very ancient practice, rude and primitive enough. There is no need, consequently, to enlarge materially upon it. The following is a brief description of the process:—The earth, which is to be of the common black description, dried and pulverized, is thrown down into the closet after use, either by means of a self-acting mechanical contrivance, or with the hand. The receptacle, a portable vessel of commodious size, is to be removed each day or each week, as the case may be, into collecting-carts, which in towns make their rounds at certain convenient hours, whence it is returned after disposal of its contents, which in the interval are consigned to the land or to some fixed depôt. The amount of earth required in each case amounts to 12 or 16 ounces, and must be perfectly dry.

From the foregoing description it will be at once seen that the whole operation and mechanism of the earth-closet are of a very simple kind; but that great care is necessary in the use, and in the preparation of the requisite material, which must be of the loosest and driest nature. Its advantages in the country and in all places where water-closets are inexpedient are very evident; for not only is its application in strict accordance with the rules of health, but there is a perfect economy or saving of the agricultural ingredients contained in human voidings. Whether these are manipulated in the most profitable manner is another matter. In all isolated dwellings, prisons, asylums, schools, barracks, in rural villages, and even in straggling and thinly-populated towns, unfitted for economical drainage from scarcity of water or other causes, the dry-earth system will be attended by good results, care in its detail management being enforced by inspection. The readiness with which an ample supply of the deodorising material can be procured is, of course, an item in the condition of success; but, in the instances mentioned, this condition may be taken for granted. It is very doubtful, however, whether, without prejudice to the agricultural neighbourhoods of large towns, a sufficient quantity of dry black earth could be made available; for although it has been so supposed, it is by no means certain that it would be consistent with sanitary rules to use it again within a reasonable period. In the use of Mr. Moule's closets, about 2 cwt. of dry earth is required per week for a family of six persons.* This, at the rate of 38 lb. per head per week, would give in the case of the metropolis, with a population of 3,000,000, a quantity of dry earth amounting to 2,600,000 tons;† or allowing, in round figures, 25 cwt. to the cube yard, a total quantity of 2,100,000 yards per annum. To put it another way, this would be equal to 100 acres of land excavated to a depth of 13 ft.; but, as it would be no easy matter to get the proper kind of soil at so great a depth, the quantity may be more fairly estimated at 1,300 acres excavated to the depth of 1 ft.

It is plain, therefore, that an attempt to carry out a complete system of dry-earth closets throughout the populous towns of this country, would be attended in the first instance by a failure of the necessary deodorising material.

Secondly, it is absolutely indispensable that material shall be perfectly dry, insomuch as, in the words of the projectors of the Earth Closet Company, "The earth-commode will no more act properly without *dry* earth, than will a water-closet without water." It is equally plain, therefore, that artificial means must be employed to bring the earth to this condition of dryness as well as of pulverisation, whereby another expense is added to the cost of soil.

Thirdly, an enormous addition to street traffic would follow the introduction of this method, which would amount in the metropolis to upwards of 40,000 one-horse loads weekly, and which must not be understood to take place during the hours of sleep, but must perforce necessitate the intrusion of labourers into every dwelling.

Fourthly, the displacement of existing water-closets in order to make room for earth-closets, would simply be doubling the expense of the internal arrangements of each household.

Fifthly, it is justly surmised by those whose experience has taught them the habits of the poor that if the material has to be bought and paid for by the weight or measure, and insists upon a certain standard of care and precaution, however slight, inevitable neglect must ensue, which no amount of costly inspection can altogether prevent. Even with water-closets, the use of which adds nothing to the immediate outlay of the householder, there is too often great difficulty in keeping the humbler classes to the simple duty of uplifting the handle.

A final, and perhaps a fatal, objection to the introduction of this system in towns of great magnitude is, that it no more affects the evils of river pollution and ill-ventilated sewers than anything most foreign to the matter. The refuse of water-closets forms but a minor portion of what we term sewage: the household refuse, the scourings of market-places, stables, slaughter-houses, knackers' yards, the refuse matter of tanneries, hospitals, and innumerable sources of pollution still remain to be dealt with. The same main sewers and house drains are required, of the same depth and of the same sectional area; the same need of sewer ventilation exists, and the same fouling of streams goes on,—in short, the whole question which it has been alleged this method has entirely solved, confronts us in all its original force.

A close and impartial examination of the objections above enumerated will hardly fail to convince the professional inquirer that something very different from what has hitherto been placed before the public in the shape of earth-closets will be needed to solve the question of sewage utilization. Dr. Hawkesley,* in a paper read at the Leamington Congress on sewage, 1866, in the course of which he stated that his acquaintance with the earth-closet contrivance extended over a period of two months, gave a series of calculations affecting the financial results of the system. In one of these he took the annual value of the liquid and solid human voidings at 10s. per head, which, perhaps, is their received value; this, in a population of 3,000,000, would give a gross value of 1,500,000*l.* sterling Against this sum he places the cost of collecting and carting to the depôt, namely, 793,000*l.*, and claims, as clear profit, the balance of 707,000*l.* But Dr. Hawkesley's figures are based upon an unsound supposition. He appears to be ignorant of the vast difference between the value of the condensed constituents of manure, which may be transported to great distances at a tariff which bears but a trifling proportion to the value of the commodity, and the value of the same constituents buried in a huge mass of comparatively valueless matter, the carriage of which fairly tends to equal its marketable value. He, therefore, falls into the error of "supposing that agriculturalists would send portions of their poor lands to London. They would pay the railway charges, and the only other payment they would have to make would be for the amount of refuse organic matter put into the soil."† This supposition, which is altogether foreign to the experience of those who are especially acquainted with marketable value of night-soil, has perhaps tended to form the views of many of the exponents of the dry-earth system. But let us suppose, on the other hand, that agriculturalists will *not* pay the carriage of their poor land either way; but that it is paid by the seller of the manure. From London outward, the average distance to which it would be sent may be taken at fifty miles; the carriage then, of one ton, at the rate stated by Dr. Hawkesley, namely, 1d. per mile, would be 4s. 2d. either way, or altogether, 8s. 4d.; let us add this 8s. 4d. to the supposed expenses of London management, and we find the following results:—

Working expenses in London	£793,000
Carriage of 2,993,000 tons of manure (Dr. H.'s calculation) at 8s. 4d. per ton	1,247,000
	2,040,000
Credit by sale of manure	1,5 0,000
Balance against	£540,000

So that, instead of a favourable balance of 707,000*l.*, we have an adverse balance of 540,000*l.* For convenience sake, no account has been made of the cost of the dry earth, but it is very evident that the cost of "scraping" so great a bulk of earth, and its subsequent preparation for proper application, must swell the cost of this system to a far greater total. It should not be omitted that the cost of spreading so bulky an article of manure is a consideration which has its due weight with farmers generally, and is a very different thing from that of applying a similar value in guano, *poudrette*, or other consolidated manure.

It is possible, and, indeed, highly probable, that Dr. Hawkesley's calculations, above quoted, are of a very crude sort, and may not do entire justice to the merits of the system he expounds; but it is precisely our intention to show what a slight value is to be placed upon a series of calculations based entirely upon supposition, warranted by no former experience, and in many respects opposed to existing facts.

Mr. Menzies, remarking upon Dr. Hawkesley's paper before the congress at Leamington, gave a very pointed illustration of the difficulties attending the disposal of night-soil. He said that at Aldershott, surrounded by some of the poorest soils in England, the whole refuse was in the first instance received into iron troughs, and carried away every morning, or thrice a week. The disposal of this was advertised for the highest bidder; but instead of the authorities receiving anything for the concession, they were compelled to pay 500*l.* or 600*l.* per annum,* although the manure was placed upon soil within a mile of the camp.† M .P.

ON THE ARCHITECTURESQUE.‡

WHEN I speak to you of "The Architecturesque," I am perfectly well aware that I am using a term which will be entirely new to you. I have this advantage, however, that its very structure will enable you to divine the tendency of the argument with which I have to submit it for adoption. The word "picturesque" will at once occur to you as that upon which this is based; and it will no doubt occur to you also that my argument need go no further than to persuade the architect that it is necessary, or at least desirable, that he should possess some word in connexion with the fine art architecture, which will be equally useful with this word "picturesque" in connexion with the fine art painting. It is scarcely possible, I think, to say that we already possess phraseology which sufficiently conveys the idea. It would be impossible, for instance, to suppose that the word "architectural" serves the same purpose in connexion with architecture that the word "picturesque" does in connexion with painting. The word "architectural" goes little if any further than the artistic elements of architectural forms, whether as ordinarily received or otherwise. Again, the word "architectonic," which we sometimes use, goes no further, I think, than the idea that architectural forms shall be subjected to structural propriety. Neither of those words, I may safely venture to say, carries anything with it of the peculiar idea which the word "picturesque" conveys in common parlance in respect of painting.

Now, let me remind you that the adoption of the term "picturesque,"—comparatively a recent act in this country,—was in reality something more than the mere adoption of a phrase. It was the foundation of an idea. The Italian word *pittoresco* had been in use for centuries, signifying "picture-like,"—"painter-like." This word had been adopted by the French in the form of *pittoresque*, signifying the same idea; but it was only, I may say, within the limits of the present century that the word "picturesque," the English form of these terms, came to be publicly used and universally accepted. Still, it is plain that the idea which the word "picturesque" conveys needed expression only, not discovery. No doubt it was well understood, both by painters and by critics, before our adoption of this term. Nevertheless, it is equally plain, I think, that our adoption of the term formulated that idea which was not capable of being expressed previously except by periphrasis, and was therefore to a considerable extent hidden or unperceived, for want of a definite phrase which would carry from one instructed mind to another the precise notion here suggested. And I may go further in saying that it was purposely to define and fix this idea, which is now so commonly known amongst us as to seem axiomatic,

* See Prospectus of the Earth Closet Company, p. 8.
† Dr. Hawkesley estimates it at 2,930,000 tons. Leaming Congress Papers, p. 56.

* Leamington Congress Papers, p. 56.
† Leamington Congress Papers, p. 56.

* Leam. Con. Papers, p. 70.
† To be continued.
‡ Lecture to the Architectural Association, February 28th, by Professor Kerr.

that the term *picturesque* was introduced. This is what I mean, therefore, when I say that the introduction of this word into England formulated a most valuable and essential idea; and my opinion is that the term "*architecturesque*" would be similarly useful in formulating an equally valuable idea, which, although it may be said to exist in the mind sufficiently clearly perhaps in many instances, I think I may venture to suggest does not receive that degree of public recognition which it might do if it were formulated by a definite phrase such as I have proposed.

Let me discuss for a moment the meaning of the word *picturesque*. It signifies *worthy of being painted*. It is a certain piquancy in objects capable of being painted by which they are made worthy of the application of the painter's art. Examples may be very easily offered; but indeed it is scarcely necessary, for the precise application and significance of the term *picturesque* are so thoroughly understood that examples can only serve as common-place illustrations. But take a landscape. Suppose the spectator is stationed upon a hill-top. His attention is directed to the valley beneath, parcelled out into square, trim, ploughed fields, with neat hedge-rows, and perhaps a well-kept brook. All the evidences of material prosperity are there; the farm-house, the farm-buildings, the engine-chimney, everything of the very best; and the spectator is called upon to say whether it is not a pleasing and suggestive landscape. Certainly, he says; suggestive of material wealth and comfort; hope looks forward to a long succession of abundant crops and a well-provided and happy population. But, if the painter is asked whether that landscape is picturesque, he says, "No: for my purpose it is utterly worthless. I care nothing for trim fields, for the suggestion of large crops, for the comfortable farm-house, for the substantial farm buildings. It is something altogether different that I want." And he turns about to another view, where he sees mountain scenery, barren crag confronting barren crag, profitless light and comfortless shade playing about at random amongst mere shapes and outlines, on a very desolate, dreary, barren condition of things altogether, but a condition of things which lights up the artist's eye, and makes his fingers tingle to paint it. It is what we call picturesque: inhospitable, and worthless enough in the mere considerations of material benefit, but to the painter, looking upon not material good, but pictorial effect, as his peculiar province, all that can be desired. This is an illustration of course common-place enough, but still it enables us distinctly to understand what it is with which we are dealing. Take the case, again, of the features of a man. Look at the "portrait of a gentleman" hanging yearly on the Academy walls. A very agreeable face, no doubt; a pleasant, comfortable, smiling countenance; an eminently respectable person; an intellectual man, perhaps, or a great man, worthy of painting certainly, or it would not be where it is, but worthy only for the sake of its owner, and certainly not for the sake of its features. But take another face: it is seamed with the furrows of care and thought; perhaps the eye is lighted up with wild enthusiasm, the hair dishevelled, the whole aspect distracted. Says the painter, "This is the subject for me: an odd man, no doubt, but a picturesque countenance; a disagreeable man very likely, but that makes no difference to me; those features are the features I desire to paint." And so on. I might take any number of such illustrations; but let me take the subject of a building, because then we are all at home. What, then, is a picturesque building? It is, in its primary sense, a building which is worthy of painting. The painter looks upon the placid face of some serene classic edifice, and he says, "This is very fine, no doubt — exquisitely proportioned, gracefully beautiful in every feature, but all that I do not care to understand: show me something which is piquante, put together no matter how, in pitchfork fashion if you like, but something which has its outline broken and its placidity disturbed, and, if you like, its mouldings worn and its face weather-stained, as the face of a man scarred and furrowed with agonies,—and its turrets cast into the clouds like wild arms tossed about: give me a building of that character, and this is what I will paint, and let the symmetries and the graces go elsewhere."

We have next to reflect upon how the painter is able to import this picturesque principle into that which, perhaps, nature supplies to him in an essentially non-picturesque form. The landscape, which is dull and uninteresting enough as presented by nature, he can nevertheless make picturesque at his will. He has at command certain effects of light and shade; there are certain common objects, perhaps only brambles and stones, which he flings about the foreground; there are certain atmospheric effects in the sky, in the aërial perspective, in the accidental shades and shadows; all of which are his well known contrivances, the "tricks" if you will, of his art; and by such means he can throw any amount of the picturesque into his landscape with perfect ease. The same, of course, with the human features. If a painter has a photograph or a "portrait of a gentleman," and desires to make it a picturesque object, he has merely to study the attitude, to dispose the drapery, to throw expression into the face, and so on, according to corresponding principles, and he makes of that which is essentially unpicturesque something as essentially picturesque as need be for his purpose. This picture-essence, therefore, which we call the picturesque, is obviously not a name merely, but an entity independent of mere associations, and certainly independent of phraseology: and what I have to say to you to-night is little more than this,—why cannot we suppose and maintain that a similar entity exists in connexion with, or in relation to, other arts; and, if this appears to be so, more particularly why should not such an entity be discerned in connexion with our own good art of architecture?

If this be so, let me next try to define what I call *the Architecturesque*. It is an essence of form and disposition, which (speaking vaguely at first) may be said to make architecture what it is. Now, what is architecture? Our old definition in this very Society twenty years ago was this—"Architecture is the art of the beautiful in building;" and I do not know that we have hit upon a better definition yet. We do not ignore building; we do not hesitate to accept it in all the fulness of the idea; but building is not architecture; architecture is not building. Architecture is the fine art of the beautiful in building; and, as all architecture must therefore be based upon building, I think it plainly follows that there is something which is to be superadded to building in order to convert building, if the expression be allowable, into architecture. This element it is that I am endeavouring to suggest to your minds; and if there be an essence, by the application of which to bricks and mortar fine art is to appear, then I go on to say that in other matters besides those which are directly architectural,—in matters which, not being themselves architectural, are still adaptable to, or connectable with, architecture,—this same spirit or essence may be applied to produce conformity and harmony of idea; and if this principle is as I describe it, I think it may be sufficiently designated by the term I venture to propose, *the Architecturesque*.

Let me next illustrate my notion by considering what is the picturesque in architecture? We understand the idea of the picturesque in painting; and what I want to do now is to dwell for a moment upon the corresponding principle in architecture. The picturesque in painting, as I have said, is piquancy;—the picturesque in architecture is piquancy still. There are various modes of the picturesque in architecture,—various mannerisms; there have been various fashions, and there will be various others; but the same principle or idea is present in all—not in a uniform degree, or in any uniform manner of development, but still as the picturesque, and the picturesque definitely. When Classic architecture was more generally, or rather universally, in vogue, some may remember that the picturesque presumed to go no further than those villas of the rural Italian style which frequently form conspicuous objects in the works of Italian painters, and which were then considered to be all that could be wished for in respect of piquancy or architectural effect. Again, when we looked to our architectural works at home, I remember very well, for it is no longer ago than within my own remembrance, that the Elizabethan was considered to be the acmé of the picturesque; indeed, when it was of more than usually ornate character, it was considered to be more than picturesque—fantastic. And it was upon this very ground, as matter of fact, that the present fashion of revived Gothic architecture arose. It was the study of the picturesque, the desire for the picturesque, which led to the study of Gothic architecture; and it has proceeded on picturesque ground step by step from the days of Carter and Britton till now, when the desire for the picturesque in Gothic architecture has become almost unlimited. In other words, as the revival of Gothic architecture sprang out of the love of piquancy, if I say that the more piquant of our designers in that style have occasionally overstepped the picturesque and passed into the fantastic, I am certainly using language which should be considered modest and moderate. So much for the forms and modes of picturesque which have successively prevailed in architecture; but observe, that the idea underlying all these developments alike has been the same idea, namely, the idea of picture-worthiness, of painter-piquancy,—of architecture, in short, worthy of painting. I need only refer you in a single word to such works as the Châteaux of the Continent, many of them so eminently picturesque as compared with our own most piquant works. The Scottish castles, again, are not, perhaps, always very convenient abodes, any more than the English castles of very early date, but they are picturesque—they are objects worthy of painting. How they came to be thus worthy of painting it is not for us at present to inquire; but still there is a rudeness, a piquancy, and ruggedness about them which render them picturesque in almost every example. Then there are the Gothic churches; and every one must say, whether adherents of Gothicism or not, that they are, every one of them, certainly most picturesque. And all this brings me to the great fact, that Mediæval architecture is all picturesque. Radically and primarily, the picturesque element is that which gives spirit to Mediæval architecture; and perhaps, when we trace back Mediævalism to its source, the principle comes to be that it is Northern architecture which is picturesque—Northern and Western, possibly, as distinguished, however vaguely, from Oriental and more southern architecture.

It is, perhaps, by a sort of contrast with all this, that we may best endeavour to show what is the architecturesque in architecture. I should describe it to be something which is architectural, and nothing but architectural. The picturesque is picture-worthy, but the architecturesque is something not pictorial nor picture-worthy, but architectural and architecture-worthy, and nothing else. Take the Parthenon. There is a building in which there is not one gleam of picturesque design, situated upon a picturesque site,—most singularly placed on the summit of a rock,—occupying such a position that in the hands of any Northern or Western people, it would have been made something certainly very different from what it is. The very suggestiveness of the site, we might suppose, would have induced any people but the Greeks to make a picturesque building. But to show how the Greeks were architecturesque and non-picturesque, there is that building standing upon such a site, with not one element that we can recognise for a moment as even tolerant of the picturesque. I call it purely architecturesque. Looking again at the interiors of the Egyptian temple, you find there everything excluded but architecture and other art architecturally treated. That is to say, the whole prospect is architecturesque. When I say the sculptures and paintings are treated in this manner, I refer to what is called their stiffness—their peculiar rigidity, the absence of natural development, the peculiar conventionalism which always makes Egyptian work so eminently adapted to Egyptian architecture. Then, again, we have another instance in the Pantheon at Rome. There is a building both externally and internally architectural, and nothing else. Not only is there no attempt to produce pictorial effect, but it is impossible to discover anything else but architectural sentiment. Again, take the Pompeian House: even the paintings upon the walls have a peculiarly conventional form, which I think is eminently capable of being described under the phrase I use. And all this leads us to conceive that Classic work generally is architecturesque; and not merely Classic, but Oriental work generally.

The inquiry now naturally arises in one's mind, whether the essential difference between Classic and Mediæval architecture does not lie here—that the Mediæval is primarily picturesque, and the Classic primarily architecturesque. I have been for years persisting in this proposition, that all Classic architecture forms one school of art, and all Mediæval architecture another school of art,—the latter picturesque, and the former something not picturesque. I have called it Classical for want of a better term. But if I am now right, I should call it Architec-

turesque, and say that the distinction between Mediæval and Classical is thus rendered plainer than before, if the one is to be looked at as based on picturesque endeavours, the pictorial, the picture-worthy, while the other is based only on architecturesque endeavours, the architectural, the architecture-worthy, pure and simple.*

PROFESSOR G. G. SCOTT ON EARLY ARCHITECTURE IN GREAT BRITAIN.†

BEFORE describing any other of the remaining works of the period, I will carry you in imagination to one which has long ceased to exist. St. Paul's Cathedral in London,—founded, as we have seen, early in the seventh century, by Mellitus, the missionary bishop, and by Sebert, king of Essex,—having been destroyed by fire, its rebuilding was commenced in 1083 by Bishop Maurice. The structure then commenced was of the most ample dimensions. The elementary scale was larger even than that of Winchester, for the width of the nave from centre to centre of the pillars was 46 ft. 6 in., while that of Winchester was 42 ft. 6 in. The nave was twelve bays in length, and each transept had five bays, exceeding in this respect (so far as I know) any other Norman church, excepting the Abbey at Bury St. Edmund's. The transepts were doubly aisled. The choir had, probably, four bays, but of its eastern termination I know nothing.

The central tower must have been nearly 60 ft. square, and the length of the transept 300 ft. The choir was raised high on an extensive crypt (the successor, in all probability, of that which I have conjectured that Bishop Mellitus had constructed on the model of that of St. Peter's at Rome). Whether the two western towers, placed beyond the outer walls of the aisles, like those of Abbot Paul at St. Alban's, were of the original date I am uncertain.

The architecture of the interior seems to have somewhat resembled that of Winchester, but was more lofty and more ornate. The plan of the pillars seems precisely the same; but the arches both of the main arcade and of the gallery were moulded, and circumscribed apparently by an enriched label. The triforium arches are not shown as subdivided, but I think that this was owing to an alteration of the original work. The clearstory had in each bay three openings. The aisle walls were, internally, arcaded beneath the windows. Whether the circular windows, which in Hollar's view light the triforium story, represent original ones, such as those at Waltham, we cannot judge.

Of this stupendous edifice, William of Malmesbury, who saw it in its unaltered state, remarks that "such is the magnificence of its decorations that it is reckoned worthy to be numbered among the most illustrious edifices; such the extent of the crypt, such the capacity of the temple above, that it seems capable of sufficing to hold any multitude of people."

Our old London cathedral, through the whole period of its existence, appears to have been the largest in England, and one of the largest in Europe,—its dimensions at a later date being 600 ft. east to west, 300 ft. north to south, and 520 ft. in the height of its spire.

One of the great builders of the first race of Anglo-Normans was Gundulph, a monk of the famous Abbey of Beck, and the friend of Lanfranc, who in 1077 consecrated him as Bishop of Rochester.

He rebuilt his cathedral, originally founded by the missionary Bishop Justus; but it is very doubtful whether any part of his cathedral now exists. He founded, also, the Castle at Rochester, though he did not build the magnificent keep usually attributed to him. He did, however, build the still more stupendous keep of the Tower of London, including the chapel already described, having been regularly employed by the king as the surveyor of the work. The existing remains of Norman style at Rochester differ so entirely from this in character that I am convinced that the parts of the cathedral which he built were just the eastern portion,—raised high on its crypt,—which were rebuilt again in the thirteenth century.

I shall return at another time to the existing Norman works at Rochester, of which I exhibit some beautiful illustrations.

Though not precisely in order of date, I will take next the great cathedral of East Anglia, which was erected, not on any ancient site, but wholly anew, at Norwich; and of which nearly the entire shell of the original fabric has come down to our own day.

It was commenced in 1096 by Bishop Herbert de Losinga, who (*O tempora! O mores!*) had, among other acts of simony, purchased the see of the sacrilegious Rufus for 1,900*l.*!—a sum equal in our money to nearly 40,000*l.* His apologist excuses this on the ground that it is lawful for the clergy to purchase the rights of the church if they cannot obtain them otherwise, adding the apostolic words, "Redeeming the time because the days are evil." The Pope, however, did not take this view, and sentenced him, for his simoniacal practices, to build a number of churches at his own cost, of which this stupendous edifice would appear to have been one, for it is distinctly stated that he built it at his own charges,—a most amazing fact, though he held the see for twenty-eight years; and our surprise is increased when we recollect that the stone of which it is constructed was transported from Northamptonshire.

The plan of the church differs from that of St. Alban's mainly in there being only one apsidal chapel to each transept, the aisle being continuous round the great apse, and in the projection therefrom of three chapels; also in the absence of western towers. Two of the chapels last named remain, and are of remarkable plan, a circle from the eastern part of which projects an apse. The nave attains the vast number of fourteen bays; each transept has four; and the eastern arm a like number to the commencement of the apse. The length is 420 ft. without the eastern chapel, now lost; that of the transept is 195 ft. Like St. Alban's, we have here the original central tower rising to its full height of 135 ft. It is richly decorated, both without and within, with ranges of arcading and other ornamental features. Within it rises a lofty lantern, round which are triforium passages on two levels. The angle buttresses without consist of a group of numerous shafts forming an octagon, and ending in turrets now terminated in another style. The upper part of the walls is curiously filled up with two ranges of large circles. The tower is a very noble work, though somewhat eccentric in its design.

We find here the aisle and its gallery, or triforium, of about equal height, and occupying about three-fourths of the height of the wall; the remainder being given to the clearstory. The triforium arches are undivided, and very much resemble those of the main arcade; differing chiefly in being generally uniform, with a slight alternate variety, while those below are subjected to frequent changes.

The usual pier on the triforium level has three shafts in a row in its reveal, carrying a wide and plain soffite, while the angles have alternately one and two recessed shafts, and the piers have alternately single and couple shafts running up their front.

The piers below are in some cases like those above, in others a portion of a vast round pillar is substituted for the row of three-shafts, the rest remaining as before described; and in one instance, on each side is a simple round column, with spiral flutings, as at Durham, Waltham, &c.

The zigzag and billet appear in the arches, and mouldings are, though sparingly, introduced. The capitals are mostly either of the cushion type, or varieties of the form I have shown you from the Tower of London, Caen, and Lincoln.

The whole internal effect is magnificent and noble in a very high degree.

The transept-fronts are divided here into three bays instead of two, as in the churches hitherto described. The arcades of the eastern arm differ considerably from those of the nave, while those of the apse unite in a very pleasing manner into a continuous range. Beneath the central arch are still remaining the shattered vestiges of the original episcopal throne.

I may mention in passing the remarkable plan of the great East Anglian abbey church at Bury St. Edmund's. I exhibit a ground-plan, from which its remarkable features and extraordinary magnitude may be judged. The length was 500 ft., and that of its western façade 250 ft. The latter is of a unique type, being flanked by two vast octagonal towers.

A very different type of the same age is found at Gloucester, the erection of which commenced in 1089. Here, as was so usual where the foundation was of the Anglo-Saxon period, the sanctuary has a vast crypt beneath it.

The peculiarities of this church are two,—first, that the triforium or gallery of the eastern arm is vaulted with a demi-vault, and from it opened repetitions of the apsidal chapels, which are placed somewhat as at Norwich; and second, that no such gallery exists to the nave, but that the height is there thrown into the aisle; so that we have a very lofty aisle of one story to the nave, and two ranges of aisle of very low proportions to the eastern arm, the two arrangements coming face to face in the transepts. The piers throughout were vast cylindrical columns, with very plain and uncouth round capitals.

This remarkable type was followed, with minor variations, in the two neighbouring monastic churches of Tewkesbury and Pershore. In all it has been greatly altered; but, by comparing one with another, the same scheme is shown to have prevailed in all three. In none were there aisles to the transepts.

The church at Tewkesbury was built just at the same time with Gloucester, and retains a feature which Gloucester has lost, a magnificent Norman central tower. It possesses also a unique feature which it is possible it may have shared with Gloucester. I refer to the enormous arch that occupies its west end, no parallel to which I know elsewhere.

This church is of peculiar value from its retaining, like those of St. Alban's and Norwich, so much of the original Norman outline, and few there are which exceed it in the solemn dignity of its external aspect.

Of the neighbouring cathedral of Worcester, as rebuilt about this time or a little earlier by St. Wolstan,—one of the few English bishops who retained their sees under the Normans,—we have only the crypt, which is wonderfully perfect in its design and preservation, and the arches which led into the eastern chapels of the transepts. We have also the unique and beautiful circular chapter-house of about the same period. Against the south transept, in an arched passage, we find either a reminiscence of the Saxon baluster or some from the old cathedral used again. St. Wolstan would, no doubt, have been glad of any such memento of good old times; remembering which, while watching the progress of his Norman church, he could not restrain his feelings, and exclaimed, "We wretched people destroy the works of the saints, that we may get praise for ourselves. That age of happy men knew not how to construct pompous edifices, but they knew well how, under such roofs as they had, to sacrifice themselves to God, and to set a good example. We, alas! strive that we may pile up stones, neglecting, the while, the care of souls."

I will not detain you by describing Hereford, built by the more pious relative and namesake of Losinga, of Norwich; nor Chichester, commenced about 1089, a few years after the removal of the ancient see from Selsey, and which was a very perfect Norman cathedral on a minor scale, with its eastern end arranged much as that of Norwich, but with two western towers. Its original features are excellent specimens of the early period.

Let us now travel far northwards, and visit St. Cuthbert's glorious shrine; but, after entering upon the great Northern road, let us step aside and pay a passing tribute to the memory of England's last Saxon king, Harold Infelix, in the church of his own founding, at Waltham.

When the nave, now standing, was erected, let us not too curiously inquire. It is a question on which some of our keenest antiquaries have differed, and let us not dispute over a site so sacred in England's history. Right goodly is the remaining fragment, by whomsoever erected. I confess to a belief that it was the work of some who still loved the memory of Harold, after living long under Norman sway; and if, in after years, the chieftains of Norman lineage delighted to trace their names in the roll of Battle Abbey, that proud memento,—

> "Of Hastings' fatal field,
> Where shiver'd was fair England's spear
> And broken was her shield,"

be it rather for Englishmen to take a mournful pleasure in the spot whither were borne from that fatal field the mangled remains of England's native but unhappy king.

The two are alike mementos of national humiliation; but let us rejoice that, though the triumphal thank-offering of the Conqueror is now a desolate ruin, the remnant of Harold's foundation, however reduced, is still a church, and has been in our day rescued from much of

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* To be continued.

† Lecture III. at Royal Academy, February, concluded. See pp. 70, 90, 108, 127, and 149, *ante*.

its humiliation and been made the subject of thoughtful and artistic care.

In its architecture you will perceive some resemblance to the glorious work which we have next to consider; for, like Durham, its bays are arranged in couplets. In one instance, on either side, the intermediate pier is a round column, pure and simple, with spiral flutings; in the others, the same form but with attached shafts towards the aisles, so that the two buildings which I have thus accidentally taken—the one on our pilgrimage to the other—are so much alike in internal design that one might fairly attribute them to the same architect. One pair of piers (which carried the western towers) are of the typical form, the others consist of two half columns flanking a shafted pilaster.

At Durham we have a glorious temple erected by Norman bishops, over the shrine of a British saint. The body of St. Cuthbert, after many journeyings and sojournings, had eventually become domiciled at Durham; for,—

> "After many wanderings past,
> He chose his lordly seat at last,
> Where his cathedral, huge and vast,
> Looks down upon the Wear;
> There, deep in Durham's Gothic shade,
> His reliques are in secret laid."

The existing cathedral was commenced in 1093, by the Norman Bishop de St. Carileph. Malcomb, king of Scotland, and his true-hearted English queen, Margaret, assisted in laying the first stones.

Sir Francis Palgrave tells us that Bishop de St. Carileph obtained the design abroad during three years' exile from his see. I know not of any church like it abroad, but this is no refutation of the statement, which seems by no means an unlikely one, and is, I think, founded on ancient authority. However this may be, a design more noble can scarcely be conceived, and I think it must be admitted that, among all the churches erected by the Normans in England, this is the noblest though far from being the first in size.

Its great beauty is internal, and arises from the carrying throughout the principle of alternating clustered piers and vast round columns, the latter having their shafts decorated with spiral, zigzag, intersecting, and vertical flutes.

This principle, in an isolated form, we find elsewhere: as in two bays at Norwich, and a similar number at Selby, and more perfectly at Waltham, and at Lindisfarne; but Durham seems to have taken the lead in carrying it throughout the church; but still more remarkable is the stupendous scale and noble proportions in which it is produced.

Though the church was begun by Carileph, he only survived its commencement for three years, and a like interval of vacancy followed his decease. During this time the monks, under their zealous prior, Turgot, carried on the work, which, on the succession of Ralph Flambard to the see, in 1099, is said to have been completed as the nave, which was carried on to completion by Flambard.

It is clear that the general design had been laid down under Carileph, as the choir, transepts, and nave agree in their leading idea; so that, whatever influence the previous building experience of Flambard obtained during his holding the deanery of St. Paul's or elsewhere may have had upon the details of his nave at Durham, we must award the honour of the scheme, as a whole, to Carileph's architect, who had supplied him the design during his exile in Normandy. Both bishops were as far as may be from the *beau ideal* of an unworldly ecclesiastic, but one would regret to attribute a work so noble to the unscrupulous and wicked agent of the oppressions of Rufus.

In plan the church, being arranged in coupled bays, has two such couplets to its choir and two to either transept (the latter much narrower than the former). The nave consists of three couplets, after which comes a single bay, and then the bay which represents the western façade; or, in other words, it consists of four couplets, the westernmost of which is disturbed by the substitution of a complex pier on either side to carry the towers, in the place of what would have been its round column. This seems an imperfection; for four couplets, clear of the tower bay, would appear a more perfect arrangement.

The transept has only an eastern aisle. The eastern termination of the church is lost. It was apsidal, and probably with a circumscribing aisle. The dimensions of the entire building are not quite equal to some of those which we have reviewed, being probably at first about 430 ft. in length by 200 ft. from north to south of the transept. The width from centre to centre of columns is 40 ft. The bays of nave and choir, similarly measured, vary from 23 ft. to 26 ft.

The piers are of prodigious size, the clusters and round pillars being respectively about 11 ft. and 7 ft. in diameter. The magnificent grandeur of the interior arises as well from the extreme nobleness of the design of these couplets of bays, as from their continuous use throughout the church. Nothing can exceed the noble symplicity and grandeur with which they are treated, nor the happiness of their proportion.

The main arcade assumes a much more commanding altitude than in most of the churches already described, occupying, what became in after-times its received proportion, of one-half of the height of the wall, the other half being pretty equally divided between the triforium and clearstory.

The great columns are precisely like those at Winchester, excepting that the three-fold group of shafts, which there occupies the lateral portion, is precisely repeated on the front and back faces, making a perfectly uniform group in all directions. This arrangement produces great grandeur, owing to the noble group of shafts it carries up to the vaulting of the central space. The arches are boldly moulded, with rolls and hollows, and enriched with the chevron. The triforium, piers, and arches are of three orders; the lower one of dividing into two arches on a centre shaft. The clearstory is usually of three unequal arches.

The capitals are all of the cushion type; those to the great cylindrical columns being octagonal. The chevron is here freely used, and the doorways are magnificently rich. One most marked feature in this cathedral is, that its central space is everywhere vaulted.

It is known that this was a subsequent work; but, in the nave at least it appears equally clearly to have been contemplated from the first, a portion of the transverse ribs having been built with the walls. In the transept, however, the evidence seems to be the other way, though I think the question has been hardly sufficiently investigated. The sister church at Lindisfarne, built almost on the same design, seems from the views one sees of it to have been vaulted from the first, or, at least, to have been so designed.

Externally, a peculiarity occurs in the gabled roofing originally covering the aisles. This does not now exist, but the evidences of it are indisputable.

The awful grandeur of the interior of this cathedral, and its noble effect from without,—standing, as it does, on a rocky promontory nearly surrounded by the deep ravine of the river, and, as a quaint old writer says,—"So envyroned with hilles, that he that hath seen the situation of this city hath seen the mapp of Sion, and may save himself a journey to the Holy Land,"—must ever cause it to rank among the grandest of our Mediæval remains: and its influence seems to have been proportioned to its merits; for, as Sir Francis Palgrave tells us, it "became the normal model of ecclesiastical architecture throughout the ancient diocese of Aidan and Finan, far beyond the Tweed."

I will only notice one more building in the present lecture, and that in the farthest south; and I make this long stride,—from the Wear to the New Forest,—for the sake of noticing the other great work of the notorious prime minister of Rufus. Mr. Ferrey, who has every right to judge of all that relates to Christchurch, has traced out certain resemblances between Christchurch and Durham. The difficulty in connecting such resemblances with the influence on each of Bishop Flambard, is (as I have before said) that Durham was commenced, and had made great progress before his succession to the see. I am, however, disposed to think that it was Durham that influenced Christchurch,—as it was not while dean, but subsequently when patron of Christchurch, that Flambard rebuilt that church; and this was contemporaneous with his holding the see of Durham.

Flambard's Church is extremely bold and simple in its parts, and well studied in its proportions. The clearstory and vaulting are of a later date; but Mr. Ferrey gives reasons for thinking the latter to have been from the first intended. The details are good and well considered; the capitals are of the cushioned form, and of that type noticed in the Tower of London and elsewhere. Some appear to have been subsequently carved with exquisite taste, in a manner which reminds one of Greek foliage. The windows of the triforium gallery, with the corbel tabling over them, still remain, and are of excellent, though simple, design; while the beautifully arcaded stair-turret to the northern transept is one of the choicest relics of the Norman style.

The buildings I have thus imperfectly described I have selected as having been all commenced within the eleventh century. I trust I may be able during the next session to follow on the style through its subsequent and more ornate stages, and on again through the interesting period of its transition into the Pointed style; and, while doing this, I hope to illustrate my remarks by means of many of the smaller creations of the style, and by some which are other than ecclesiastical.

For the present,—after travelling over an eventful period of nearly seven centuries, and tracing out the rise of British architecture through many phases,—I must bring my course for this session to a close, apologising if I have, in the warmth of patriotism, been induced to lead you out of the beaten and accredited track of art; though at the same time convinced that the architecture we have been considering will be found on close examination to contain germs and principles which have been and may again be made to germinate into styles of art of the highest and noblest character.

SCHOOLS OF ART.

THE BIRMINGHAM SCHOOL AND LOCAL SOCIETY OF ARTS.

THE annual meeting of the Birmingham Society of Arts and School of Design has been held in the Rooms of the Society of Artists, in New-street; the Right Hon. Lord Leigh in the chair.

Mr. C. R. Cope read the report of the committee, in which it was stated that the number of students receiving instruction had been 1,010, showing an increase of 3 since last year. The fees received amounted to 756*l.* 12s. 6d., showing a decrease of 22*l.* 17s. Of the 785 male students, 257 were school-boys (including 147 from the Grammar School. Recognising the fact that the present system of instruction required improvement, the committee had appointed a sub-committee to investigate the subject, to confer with manufacturers, and to obtain their views of what was required. They hoped that a scheme adequate to the requirements of the town would be the result. As the present accommodation was quite insufficient, and the Midland Institute classes were also cramped for room, it was most desirable that the whole of the rooms at the Institute should be given up to the Institute classes, and that large and commodious premises should be obtained for the School of Design.

Mr. Laundy read the statement of accounts, which showed that the income of the society for the year was 1,300*l.*, and at the close there was a deficiency of 3*l.* 11s. 6d.

Mr. H. Cole, C.B., of the South Kensington Museum, who was present, addressed the meeting. He said he would venture to give them a piece of advice, and that was that the sooner they got better premises the better. But as to the Birmingham School of Design being in a bad way, it was a fact that on the whole they raised more money than any School of Design in the kingdom. They were at the top of the tree in respect to funds. Last year they took the greatest amount of public money by their results. In 1866 they had taken 148*l.*, in 1867 that amount was increased to 297*l.* Having doubled their revenue was not a bad sign. And, again, he found that the students were more numerous than those of other schools. In Birmingham they had 2,537 children learning drawing; in fact, a larger number than in any of the other six great towns. And they had taken 146*l.* from the State, while the highest sum earned in any other town was 73*l.* He entirely agreed that South Kensington was for their benefit, and that they had the most perfect right to all the advantages from it that they possibly could get. They had been told that there was a horrid woman lived there, called Dalilah, and that no matter what Parliamentary Samson entered there, his locks were shaved by this Dalilah; and the mission particularly assigned to one gentleman was to get rid of this woman. He supposed the woman did exist; but he might remind them, in reference to South

Kensington, that if they did not have out of it what they wished to have, and what they desired to have, it was entirely their own affair. South Kensington had been perfectly willing—had been bawling out, indeed, all the time, and saying, "Do, in Heaven's name, come to Kensington and borrow what you want." How many things had they borrowed.

The exhibition of students' works has also taken place. The works exhibited were numerous in all the divisions and subdivisions prescribed by the Department of Practical Art. They occupied the walls of the Rotunda, and one of the small rooms was devoted to outline, mechanical, and architectural subjects. The drawings, which were very numerous, were chiefly from sculptured ornament, and executed in monochrome (sepia).

THE FOOD SUPPLY QUESTION.

AN elaborate and valuable paper, "On the supply of animal food to Britain, and the means proposed for increasing it," has been read to the Society of Arts, by Mr. Wentworth Lascelles Scott, F.A.S.L., &c., whom many of our readers will remember as a correspondent of the *Builder*, chiefly on chemical subjects. The paper was illustrated by important statistical information, in a tabular form, collected, it would appear, with a view to the publication of "a somewhat ponderous volume, yet in embryo, on the 'Food Resources of the British Empire;'" and there was before the meeting a variety of samples of food prepared in different ways, according to patented and other processes, and amongst others a specimen of bisulphitized beef, sent by Mr. Ede, of her Majesty's victualling yard, Deptford. The process by which this meat was preserved appears to be regarded by Mr. Scott as one of the most promising of all those various new processes of which one is every now and then hearing. On this subject, he said:—

"Of the chemical antiseptics, there is at the present time but one which appears to possess the necessary qualifications for preserving meat cheaply, easily, effectively, and without either injuring the nutritive qualities or imparting an unpleasant flavour; I allude to that patent on which the process of Messrs. Medlock & Bailey (of which numerous illustrations are now before you) is founded—the bisulphite of calcium, or, as it is commonly rendered, the bisulphite of lime.

It is remarkable that sulphurous acid has frequently been employed alone for the preservation of meat, but has failed in all instances from its volatile nature, causing it to be dissipated too soon to be any real protection. The sulphites of sodium and potassium [combinations of sulphurous acid with soda and potash], in solution, have likewise been patented for the like purpose, but their unpleasant flavour, their action upon the meat itself, and the injurious nature of the purgative sulphates [or combinations of sulphuric acid with the bases] formed by their oxidation, have precluded their use in quantities calculated to influence the 'food of the people' in any great degree; moreover, their antiseptic action is not so certain as that of the preparation I would specially introduce to your notice.

The neutral sulphite of lime is only slightly soluble in water, and its antiseptic properties are by no means so marked as those of the bisulphite, which contains double the amount of sulphurous acid, is perfectly soluble, and, when oxydised, is merely converted into sulphate of lime—a substance perfectly harmless and inert.

In this preparation, I believe we have a means of converting to our use the enormous meat stores of Australia and South America, and I look forward with confidence to seeing beef and mutton imported for sale at 2½d. to 3d. per pound, of a quality equal to any we can now procure.

I have prepared a number of specimens (now before you) with this solution; they have been preserved for periods varying from six weeks to as many months; and among them you will find some mutton treated under the immediate superintendence of the Food Committee of this society in November last.

I would also beg to draw your attention particularly to these samples of fish, contributed by Mr. Edward Acres, of Youghal, near Cork, as sufficiently demonstrating what could be done in this department. Mr. Acres tells me that immense quantities of fish are frequently captured in the Bay of Youghal, but that, there being no adequate demand at the moment, the large surplus of the same—from 50 to 100 tons sometimes—has to be quickly destroyed, as is often the case elsewhere.

I sincerely hope that the bisulphite of lime may prevent such wholesale destruction of nutritive animal food, which, to my thinking, seems a reproach to our civilization, a satire upon our science, when we know that so many will spend hours in turning over dust-heaps—I have seen the poor wretches at their melancholy task—for the purpose of extracting any tails or bones of fish to which some fleshy portions might adhere. These, an old woman in Whitechapel told me some years ago, 'makes an old crust more filling,' and her scanty meal certainly must have had a flavour about it."

The obtainment of an indefinite supply of fish from the inexhaustible Irish coasts, we have often urged; and any process that would promote this immensely important object well merits the utmost attention. Even on our own coasts the waste of such food by hundreds of cart-loads used as manure while thousands and tens of thousands of the population of Britain and Ireland are either starving, or struggling on the brink of starvation, from the dearness of food, is truly awful. It really justifies what Continentals say about the stupidity of the British islanders. On this subject Mr. Scott says,—

"I was speaking on the subject of dear food to a friend, not long ago, when he remarked, 'Why don't the people eat fish, if meat is so dear and so scarce? I have seen more fish thrown away, or allowed to decay for manure, within a few days, than would be required to keep Southampton in animal food for a month!' And this observation brings us to another subdivision of our subject,—the supply of fish. Here, again, the same melancholy story holds good,—the supply is but a fraction of the demand,—while, in addition we are forced to the humiliating confession that many thousands of tons of fish are being thrown away and absolutely wasted after they have been caught, in a country where 23,000 people die annually from insufficiency of food. Moreover, it is not only that fish, as a rule, is dear now, as compared with former times (when it was by no means uncommon for articles of indenture to contain a clause stipulating that the apprentice was not to have salmon for dinner more than two or three times a week!), but we have the anomaly constantly occurring of a starving population in one part of the country, simultaneously with the absolute destruction of many tons of nutritious food in another."

Perhaps it is only some such process of preserving fish and other food as that brought under special notice by Mr. Scott that is wanted to turn an abundant supply of capital to fishing and other food-providing purposes, and to bring about a wonderful change for the better in our food supplies.

MEMORIAL WORKMEN'S CLUB AND INSTITUTE, MADELEY, SALOP.

A MEETING of subscribers to the above memorial took place on February 3rd, in the Infants' School-room, Madeley, for the purpose of selecting from the collection of designs and plans sent in for competition the one most suitable for the purpose. It may be remembered that in the particulars issued to architects it was specified that the building should be of the red brick of the neighbourhood, with white stone dressings, and that it should contain the following accommodation, namely, workmen's common hall or club-room; youths' common hall or club-room; kitchen to supply refreshments; a smoking-room, a reading-room, committee and class rooms; a residence for hall-keeper; a large hall for concerts, lectures, &c.; retiring-rooms, lavatories, &c. These requirements appear to have been well kept in view by competitive architects, who, whilst adhering to them, have shown considerable care in the arrangement of the rooms and much artistic merit in the elevations which accompany the plans. The subscribers selected three designs from the collection of upwards of fifty sent in, which they agreed to submit to the decision of Mr. G. Maw, with a request that he would in the course of a fortnight make a selection and submit it to them at the next meeting.

The subscribers met on Wednesday, the 19th, to receive the report of Mr. Maw relative to the designs submitted to him. Mr. Maw's decision was in favour of the design bearing the motto "Well Considered," by Mr. John Johnson, architect, of Moorgate-street, London. The cost of the building will be about 1,400*l*.

MEDALS AND PREMIUMS OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT a special meeting of the members of this Institute held on Monday last, the recommendation of the council that the Royal Gold Medal of the current year, should, with her Majesty's gracious sanction, be awarded to Austen Henry Layard, D.C.L., M.P., was unanimously adopted.

The following medals and prizes were awarded:—

The Soane Medallion, to which, under certain conditions, the sum of 50*l*. is added by the Institute (subject of competition, "Design for a Town-hall"), to Mr. George Vialls. A second prize of 20*l*. was given by Mr. W. Tite, M.P., president, to Mr. Henry L. Florence, whose drawings were considered next in order of excellence; and a Medal of Merit to Mr. Herbert M. Marshall.

The late Sir Francis E. Scott's prize of 10*l*. 10s. (subject of competition, "An Establishment for Baths and Wash-houses designed in accordance with modern requirements, and in the style of the thirteenth or fourteenth century") to Mr. Ernest Lee.

The Institute Silver Medal, with 5*l*. 5s. (subject of competition—"The restoration of the choir of Old St. Paul's Cathedral," founded on the plates, illustrating Dugdale's work), first prize to Mr. Edmund B. Ferrey. Medal of merit to Mr. N. Renault Mangin.

In this competition Mr. E. B. Ferrey, complying with the conditions prescribed in last year's list of prizes, sent in drawings illustrating the restoration of the entire cathedral.

The Institute Silver Medal, with 5*l*. 5s. (subject of competition—"Measured drawings of any building erected before the year 1700," and hitherto unpublished), to Mr. William Henman. Medal of merit to Mr. Charles H. Heathcote.

In this competition the drawings of Mr. Morton M. Glover, were "honourably mentioned."

The Institute Medal for the best essay "On the origin and progress of window tracery," or other suitable subject, was awarded to Mr. W. Scott Champion.

The designs, drawings, &c., are now on view, from ten to five daily, at the Institute, where they may be inspected by any one taking a card of introduction from a member.

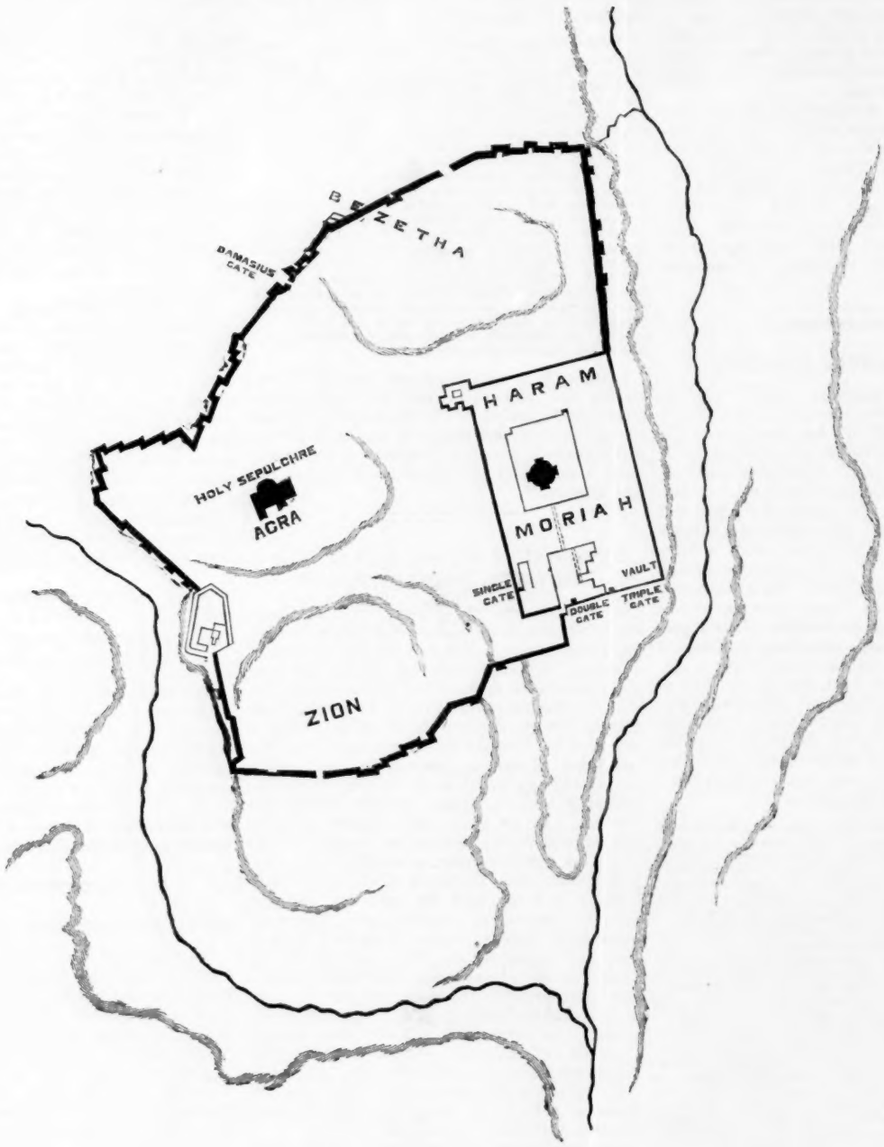
The following is a summary of the number of essays, designs, and drawings submitted in competition for the medals and prizes offered:—For the Institute medal (for essays), six essays; Soane medallion, five designs; Sir F. Scott's prize, three designs; Institute medal, with five guineas (restoration of the choir of Old St. Paul's), two sets of drawings; Institute medal, with five guineas (measured drawings), three sets of drawings; and Student's prize in books, one design.

THE LABOURERS' DWELLINGS FOR THE LIVERPOOL CORPORATION.

AT the last meeting of the Health Committee, the tender of Mr. Hugh Yates, for the erection of a block of labourers' dwellings on the land purchased by the corporation, between Sylvester and Ashfield streets, at a cost of 12,321*l*., was accepted, being the lowest sent in. Mr. Newlands, the borough engineer, said the amount was below both his own estimate and that of the designer of the plans.

VITAL STATISTICS OF LONDON FOR 1867.

A SUMMARY of the weekly returns for the year 1867 has been issued in a printed form. Out of a population of 3,082,372 (containing 207,134 more females than males) the number of deaths was 70,588, of whom 36,276 were males, and only 34,312 females. The number of births was 112,264, of whom 57,502 were males and 54,862 females. If the rising and falling rate of mortality be taken as the criterion of health, the year 1867 was the healthiest that London has enjoyed since 1860. Through the four years that followed 1860 the annual mortality uninterruptedly rose, and reached 2·653 per cent. in 1864. It then began to decline, and probably the decrease would have continued in 1866 if cholera had not attacked London in that year. In 1867 it was 2·298 against an average of 2·436. In Birmingham the death-rate of 1867 was 2·427, in Sheffield 2·467, in Liverpool 2·957, in Newcastle-on-Tyne 3·079, in Manchester 3·140. In Dublin it was 2·706, in Edinburgh nearly the same, in Glasgow 2·854. Zymotic diseases, in which class the chief heads are typhus, small-pox, measles, scarlatina, whooping-cough, and diarrhœa, were fatal in 15,027 cases, which is more than a fifth part of the whole. This aggregate result was, however, considerably less than it had been in any previous year since 1860: and the only disease in this class which displayed increased activity was small-pox, the deaths from which were 1,332. Professor Frankland, in an appended report on Metropolitan water, says:—"The New River Company stands alone in the perfection of its filtering apparatus. The seven companies who occasionally or habitually send out turbid water, subject the inhabitants of more than 300,000 houses to the unnecessary expense of private filtration. The distribution of water in the metropolis still continues, with but slight exceptions, upon the intermittent system, which has been abolished in almost every other town of importance in the United Kingdom. In addition to the well-known evils attending the storage of water in butts and cisterns under this system, there is the *danger of the leakage of sewage into the pipes whilst the pressure is withdrawn*. An instructive instance of this occurred in the West Middlesex Company's district in June last."



SKETCH-PLAN OF JERUSALEM.

[See page 165, *ante*.]

THE DUDLEY FOUNTAIN.

THE people of Dudley (Worcestershire) are indebted to the Earl of Dudley for the fountain represented by our engraving. It is the work of Mr. James Forsyth, sculptor, who was selected in a limited competition, and it has cost about 3,000*l*. The fountain stands in the market-place, and consists of a quadrilateral, pierced by arches in one direction, and in the other supported by semi-circular projections, each bearing a dolphin on the outside. Immediately above these latter are two large fronts of sea-horses, the whole surmounted by a pyramidal roof, culminating in an allegorical group, representing Industry in General and Industry in Particular. The former figure is a girl, with a spinning apparatus, and the latter is an engineer. The vaulted part is perforated by two windows, glazed with coloured glass, thus providing light to the central jet which starts from a series of three marble tazzas, one above another. In the two sides corresponding to the exterior semicircular projections are niches, occupied by figures representing an "agriculturist" and a "miner," in allusion to the characteristics of the county. The corners of the quadrilateral, forming piers, are ornamented with festoons of fruits; while the keystones are decorated, one with the head of a river-god and the other with that of a water-nymph. The spandrels of the arches are enriched by genii, bearing scrolls, with mottoes. The legend, sub-divided into four parts, is one of the songs of the Children of Israel, under a providential supply of water as they were passing to the Promised Land. In our version (Numbers. xxi. 17) the whole song runs thus:—

> "Spring up, O well;
> Sing ye unto it.
> The princes have digged the well,
> The nobles of the people have digged it."

The words are applied in the first instance to the physical and material emblem; whilst the special historical circumstances of the living interest of the song at Beêr find their correspondence in the work we are describing. The maidens of Israel, as they drew the water, claimed gratefully the bounties of God's providence, "Spring up, O well," and encouraged each other in glad recognitions of His goodness as manifested therein, "Sing ye unto it;" whilst the strongest feeling of sympathy and co-operation between the rulers and the people is conveyed by the way in which the latter made the labour of the former the burden of their song: "The princes have digged the well: the nobles of the people have digged it." On the front of the fountain is the following inscription:—"*Hunc Fontem in Usum Populi, D.D., Comes de Dudley*, A.D. MDCCCLXVII." The base of the fountain is of red and gray granite, forming an agreeable contrast. There are two streams of water supplied to ladles from lions' heads; two large basins, for the use of cattle; and four smaller ones, near the ground, for the accommodation of dogs and other small animals. The cattle-troughs are supplied from the mouths of the dolphins previously mentioned. The height of the fountain is 28 ft.

A circular pavement in red and gray granite and black limestone has been recently added. This is arranged in geometrical patterns, in concentric circles. The outer circle is of gray Aberdeen granite, and the inner one red. These are connected by gray granite pitchers, which radiate in patterns like the points of a star, the ground being the black local limestone, which forms an appropriate ground-work to the whole erection.

Mr. Forsyth acknowledges his obligations to Mr. R. Monti, and to his own foreman, Mr. Dyke, for assistance in amplifying the design and carrying it into execution.

THE DUDLEY FOUNTAIN.—MR. JAMES FORSYTH, SCULPTOR.

LIGHT AND COLOUR.

THE three phases of the theory of light and colour,—the physical, the physiological, and the æsthetic,—are too frequently separated as distinct specialities, and studied independently of each other. The æsthetic phase is of the three, perhaps, the most studied, cut off and isolated from its supports. This separation, either partial or complete, is, I venture to think, inimical to a comprehensive view of the entire theory of light and colour. I have therefore endeavoured to give symmetry to the materials I have gathered, in order that they may be grasped as a whole.

Though in some degree a student of science, I do not believe science has the power to be the all in all, to supplant feeling in art. The subtlety of taste, as of life, appears to elude close analysis. Its true importance to art is as the compass to the mariner when the heavens are clouded. But we might say the same of science in reference to many other professions.

A river has been accepted as an emblem of life; its continuity, smooth-flowingness, rolling roughness, and loud murmuring fall have analogues in human nature; but mention hydrodynamics, and unreasoning fancy receives a shock: still the thinker knows that there is not a ripple, eddy, nor wave, but moves in conformity with a few simple principles, and although science may be unable to follow and formulate all the complications of action and reaction, the currents and eddies of a cloud of dust, or a stream of water, it can point the way, and a correct compass is invaluable to the steadfast helmsman. This, I take it, is what true theory is to every earnest, practical man, be he artist or craftsman.

One very noticeable feature in the advance of science is, that it traces parallels and analogies between phenomena long believed to be divided and distinct, is the growing perception of their dependence on some common phenomenon of a more general and elementary nature than those which form the subject of either separately: thus the analogy subsisting between sound and light has been traced into a closeness of agreement, which can hardly leave any reasonable doubt of their ultimate coincidence in one common phenomenon, the vibratory motion of an elastic medium.

[The writer here gives a short history of the two great theories,—the Corpuscular and Undulatory,—which so long divided the scientific world and traced the growing conviction in the correspondence of the physical modes of light and sound; but this we need not print.]

More recently a very sweeping generalization has been suggested by Professor Groves, in the hypothesis known as the Correlation of the Physical Forces. It would ascribe all phenomena to a monophysical origin,—that is to say, it supposes light, heat, sound, electricity, &c., to be merely modifications of an active *substans*. That everything *objectively* varies only in configuration and in mode and degree of motion, but produces *phenomenally* or *subjectively* all that infinite variety in things which is commonly, but erroneously, believed to exist internally, and independently of sense; that we are sentient organisms amidst the great ocean of active matter, which now surging and vibrating against the optic nerve, produces light and colour; against the auditory nerve, and it breaks in sound or musical notes; against the olfactory and gustatory nerves, and its spray is scent and taste; or, beating against the broader quays of the nerves of common sensation, excites the sense of touch. That, independently of sentient beings, there is nothing but a colourless, silent, fluctuating universe. It is somewhat difficult to conceive this condition of material nature without some previous habit of abstract reasoning; nevertheless, it is one which both the Newtonian and Huyghenian theories support; for, if you recollect, Newton ascribes the production of different colours to the different velocities of the atoms emanating from the sun or other luminous source. The colours, mark, are not inherent in the atoms; for, if they were, colour would be independent of differences of velocity and refraction. In the undulatory theory, too, which makes the propagation of light analogous to that of sound, and which is the theory now generally accepted, light and colour are supposed to be produced in the eye by undulations of different velocities and magnitudes, just as sound is produced in the ear by the different velocities of the vibrations communicated by the air. Muller says,—"That which, through the medium of our senses, is actually perceived by the sensorium, is indeed merely a property or change of condition of our nerves; but the imagination and reason are ready to interpret the modifications in the state of the nerves, produced by external influences as properties of the external bodies themselves. This mode of regarding sensations has become so habitual in the case of the senses, which are more rarely affected by internal causes, that it is only on reflection that we perceive it to be erroneous." This is a most important consideration for all those who enter upon scientific or æsthetic studies; and no safe progress can be made in either till this position is thoroughly comprehended. But to return to what I was more immediately endeavouring to point out, viz., that in all three of the theories, recently glanced at, the supposed physical cause of light and colour is simply moving matter. This is the first great deduction we have to make from the purely physical inquiries concerning the nature of light and colour.

We now pass on to consider the facts on the physiological side of the theory of light. And if the physical hypothesis be correct, we might surmise, *à priori*, that the same simple physical cause which produces all those diverse effects on the retina from without might also cause similar effects from within; and such we find to be the case,—one of the first principles of physiology being *that external agencies can give rise to no kind of sensation which cannot also be produced by internal causes, exciting changes in the condition of our nerves*. The vibrations of a fluid existing in all space, when of a certain rapidity, produce in the retina the sensation of a certain colour; when of a different degree of rapidity, that of another colour, these colours or sensations being modes of reaction of the retina. The simultaneous impressions of undulations of different rapidity upon the same points of the retina excites the sensation of white light. These same sensations of colours and light may, however, be produced as we have just stated, without those external undulations.

One uniform internal cause acting on all the nerves of the senses in the same manner, is the accumulation of blood in the capillary vessels of the nerve, as in congestion and inflammation. This uniform cause excites in the retina, while the eyes are closed, the sensation of light and luminous flashes; in the auditory nerve humming and ringing sounds. The mechanical influence of a blow, concussion, or pressure also excites in the eye the sensation of light and colours. It is well known that by exerting pressure upon the eye when the lids are closed, we can give rise to the appearance of a luminous circle; by more gentle pressure the appearance of colours may be produced, and one colour may be made to change to another. A mechanical influence excites also peculiar sensations of the auditory nerve. It has become a common saying, "To give a person what will make his ears ring," or "what will make his eyes flash fire," or "what will make him feel;" so that the same cause, a blow, produces in the nerves of hearing, sight, and feeling the different sensations proper to these senses. Here, then, is another series of facts pointing to Force as the cause of light; and not only this, but to the correlation of light and sound, by it being possible to excite the senses of sight and hearing by the same means. Voltaic and frictional electricity, and chemical agents, such as narcotics, digitalis, &c., produce the different sensations proper to the two senses. From these phenomena we naturally turn to the consideration of the "ocular spectra," consequent on impressions on the retina. The duration of the sensations of the retina is much longer than that of the impressions which produce them. According to Plateau, the sensation persists 0·32 to 0·35 of a second after the impression has ceased; and the duration of the "after sensation" or "spectrum" is greater in a direct ratio with the duration of the impression which caused it. Hence the image of a bright object, as of the panes of the window through which the light is shining, may be perceived in the retina for a considerable period, if we have previously kept our eyes fixed on the object for some time. The duration of these images in the closed eyes may also be very much prolonged by passing the hand up and down before them, so as to permit the light to fall upon them only at intervals. The after duration of sensations consequent on impressions of the retina explains the appearance of a circle of light produced by moving a luminous body in a circle before the eyes, as well as that of the confusion of the images of the spokes of a rapidly revolving wheel, or of the prismatic colours painted upon a spinning top.

The ocular spectra may be divided into three classes. They are either colourless spectra left by colourless images, or coloured spectra after colourless images, or coloured spectra after coloured images.

Colourless Spectra left by colourless Images of real Objects.—The spectra left by the images of white or luminous objects are ordinarily white or luminous; those left by dark objects are dark. Thus, the spectrum of a luminous body rapidly moved before the eyes is also luminous. If the eye, after being subjected to a vivid impression, be closed and turned away from the light, or, what is better, quite covered, white or luminous spectra of the objects which were white and luminous are seen, and dark or black spectra of those which were dark or black. Thus, if while sitting in our room we look for some time at the light window with its dark framework, and then suddenly close the eyes, turn them from the window and cover them with the hand, so that no light, not even that which would pass through the eyelids, can reach the eye, bright spectra of the panes of the window, and a dark spectrum of the framework, are seen.

The relation of the light and dark parts in the images may, however, under certain circumstances, be reversed in the spectrum; what was bright may be dark, what was dark may appear light. This occurs whenever the eye, which is the seat of the spectrum of a luminous object is not closed, but fixed on another bright or white surface, as a white wall or a sheet of white paper. Hence the spectrum of the sun, which, while light is excluded from the eye, is luminous, appears black or grey when the eye is directed upon a white surface. In the same way the spectra of the window-panes appear dark, those of the dark framework light, if we look with closed eyes towards the light of the window, so that the light passing through the eyelids gently stimulates the retina. These phenomena are easily explained. The part of the retina which has received the luminous image remains for a certain period afterwards in an excited state, while that which has received a dark image is in an unexcited, and therefore much more excitable condition. If the eye in this condition be directed towards a white surface, the luminous rays from this surface produce upon the excited part of the retina a much more feeble impression than upon the other parts which are as yet unexcited, and therefore more susceptible of their action. Hence the parts of the retina upon which the dark portions of the previous image had fallen receive a much more intense impression from the white surface than those upon which the luminous portions of the image were directed; and hence the inversion of the light and dark parts of the image in the spectrum thus seen.

Similar phenomena are presented by the whole field of vision when a sudden change is made from light to darkness, and *vice versâ*. On coming from darkness into a bright light, every object appears excessively bright, on account of the great susceptibility of the retina after its previous rest; and, on passing from light into moderate darkness, we at first see nothing, until the retina, exhausted by previous excitement, shall have recovered sufficient excitability to be acted on by the slight degree of light to which it is now submitted. A light object always appears brighter when viewed after a dark object, or even viewed side by side with it. Similar phenomena are observed with relation to the other senses. Cold is felt most intensely when it follows the impressions of heat or warmth; and, after exposure to a great heat, a slightly different temperature, which under ordinary circumstances would feel warm, will produce the sensation of cold. The distinctions between light and darkness, heat and cold, are therefore merely relative.

Ocular spectra seem to change their place with relation to our body with every movement of the eyes, and, for an evident reason, are still seen, in whatever direction we may turn the retina. If we look for a long time at a black square upon a white ground, and then divert our eyes slightly, so as not entirely to leave the square, but rather to look more directly at its border, a portion of the spectrum which it has produced, will appear free upon the white ground, as a bright margin to one part of the dark image; while, to a certain extent, the true image and the spectrum will lie upon the same part of the retina, cover-

ing each other; another portion of the true image of the object being left free. In such a case the free portion of the ocular spectrum appears very bright; the free portion of the true image very dark, while the parts of the image and the spectrum which are coincident appear of a dark grey colour, as if the two conditions of black and light were there balancing each other. The explanation of the phenomenon is this,—the sensation of white in the part of the retina which was before the seat of the image of the black object is more intense, because that part of the retina was previously unexcited: hence the bright margin. The part of the image where the true image and spectrum are coincident remains unchanged; while the portion of the true image which is left free appears blacker than before, because it now falls upon a part of the retina which had previously received rays from the white ground, and has consequently lost part of its excitability. If the impression of a luminous object on the retina be very intense, as when produced by the light of the sun's image, the spectrum consequent on it is not merely light when seen upon a dark ground, or dark when seen upon a white surface, but assumes different colours in succession, which are expressions of the states which the retina passes through in its transition from the condition of dazzling to its natural state. The dark spectrum of the sun, when the eye is fixed upon a white surface, assumes different colours, in passing from the dark to the light, in the following order:—Black, blue, green, yellow, white. The appearance of these colours commences at the borders of the spectrum. When the spectrum has become white, it is no longer distinguishable from the white surface on which it is viewed; that is, the white surface now produces the same sensation in this part of the retina as in all the other parts which had not been submitted to the dazzling action of the sun. If the eye, after viewing the sun, be exposed to perfect darkness, that is, if light be entirely excluded from it, the colours of the spectrum will succeed each other in the inverse order, namely, from white through the lightest, and then the darker colours, to black; thus white, yellow, orange, red, violet, blue, and black. When the spectrum has become black, it can no longer be distinguished from the surrounding darkness; the part of the retina which was its seat having regained the same unexcited condition as the other parts which were not acted upon by the image of the sun.

These phenomena, which cannot be explained by external conditions acting on the eye, are another proof that colours have their immediate cause in the condition of the retina itself.

The ocular spectra, which remain after the impression of coloured objects upon the retina, are always coloured; and their colour is not that of the object, or of the image produced directly by the object, but the opposite or complementary colour. The spectrum of a red object is, therefore, green; that of a green object, red, &c. If we fix our eye for any length of time upon a bright red spot upon a white ground, and then suddenly turn it from the red spot and let it rest upon the white surface, we see an ocular spectrum of the red spot of the same size and form, but of a green colour. If, on the contrary, we turn our eye only slightly to the side, so as to fix it on the border of the red spot, the spectrum is seen partly covering the object. A portion of the true image of the object appears free, and a portion also of the spectrum distinct from the true image; but this portion of the spectrum is green. At the part where the true image of the object still falls upon the same part of the retina,—that is the seat of the affection producing the phenomenon of the spectrum,—the colour of the object is seen, but it is faint and grey, whilst at that part of the true image of the object which now lies upon a part of the retina previously directed to the white surface, and which is therefore more susceptible to the normal sensation of the red. The physiological explanation of the phenomenon is the following. The perception of any one of the three simple colours consists merely in the retina being in one of those conditions to which it has a tendency when in a state of excitement. If this condition be artificially excited in an intense degree, the retina acquires a tendency to an opposite state, or that which is complementary, and which is consequently perceived as the ocular spectrum.

Physiological Colours produced by Contrast.—A very small, dull, grey strip of paper, lying upon an extensive surface of any bright colour, does not appear grey, but has a faint tint of the colour which is the contrast of that of the surrounding surface. Thus, for example, a strip of grey upon a green field often appears to have a tint of red, and when upon a red surface a greenish tint, and so on. For the production of this phenomenon it is necessary that the colour of the extended surface should be very bright, containing abundant rays of white light. Every coloured paper is not adapted for it. It is shown most distinctly by holding a coloured glass covered with thin paper before a lamp, and covering any spot upon the glass and paper, with a strip of grey tint. The strip of grey is then readily seen to have the colour the contrast of that of the glass. The new colour is always that which, combined with the colour of the surrounding surface, would yield the sum of the three simple prismatic colours, red, yellow, and blue. The colour excited by the impression of yellow is, for example, violet, which contains blue and red. The colour excited thus, as a contrast to the exciting colour, being wholly independent of any rays of the corresponding colour acting from without upon the retina, must arise as an opposite or antagonistic condition of that membrane; and the opposite conditions of which the retina thus becomes the subject, would seem to balance each other by their reciprocal reaction. We have also in these phenomena a fresh proof that colours, physiologically considered, are merely certain states of the retina, which are capable of reciprocally exciting each other in different parts of that membrane. The coloured shadows sometimes observed are phenomena belonging to the same category. But all coloured shadows are not of this nature: some are owing solely to the shadow being illuminated by a coloured light. For if a coloured light fall upon a shadow produced by colourless light, or by light of a different colour, the shadow of course appears coloured. In the faint light of evening, the shadows of bodies appear by candle-light blue or yellow, according as the bluish light of the sky or the yellow light of the candle falls upon them. The two kinds of light may produce two shadows of different colours from one body. Of two shadows thus produced by a small rod upon a sheet of white paper, the one which cannot receive any of the bluish light of the sky, but receives light from the candle, will appear yellow; while the other shadow which receives no light from the candle, but is illuminated by the bluish light of the sky, appears blue. All other parts of the paper present no predominant colour, since they receive rays from both sources of light. The purely physical nature of these coloured shadows is obvious.

But there are coloured shadows, as we have observed, dependent on a physiological cause. If light transmitted through coloured glass, or reflected from a coloured body, fall upon a white surface, and a shadow be produced on this surface, which now appears coloured, by means of a narrow body raised upon it, this shadow, when illuminated by the white light of day, will appear of the complementary colour to the ground. The experiment succeeds also if illuminated by the light of a candle. The illumination of the shadow is a necessary condition for the production of the phenomenon. For if coloured light be thrown into a cavity otherwise perfectly dark, a shadow there produced does not appear coloured. The coloured shadows are usually ascribed to the physiological influence of contrast; the complementary colour presented by the shadows being regarded as the effect of internal causes acting upon that part of the retina, and not of the impression of coloured rays from without. A strong corroboration of this view is the fact observed by Count Rumford, that the colour of the shadow does not appear different from that of an ordinary colourless shadow, when it is viewed through a tube in such a manner that the coloured ground is not seen at the same time. Great probability is also conferred on this explanation of the phenomena by their analogy with the facts previously spoken of, viz., those in which a small grey strip upon the surface of a bright colour appears of the opposite complementary colour. In the instance of the coloured shadows, the case is complicated with many deceptive circumstances; but in that of the experiment just alluded to the phenomenon is reduced to its simplest conditions.

This brings us to the physiological basis of the harmony of colours. The phenomena we have just described clearly prove that the action of one colour upon the retina disturbs the equilibrium of its condition, exciting in it one predominant state, and that a tendency exists in it to the development of the opposite state complementary of the one thus excited: we cannot, therefore, be surprised at finding that the combinations of colours producing a pleasing and salutary impression both upon the eye and upon the mind are those which contain the colours thus opposed to, or complementary of, each other. All complementary colours have an agreeable effect, and all bright colours which are not complementary a disagreeable one, if they predominate. In this sense the complementary colours may also be styled harmonic; and those which are not complementary of each other, disharmonic. A combination of complementary colours is an harmonic combination; all other combinations of colours are disharmonic in proportion as they belong to one simple prismatic colour, and are at the same time very bright. A predominant flaming red is as unpleasant as a predominant glaring yellow, or a uniform predominant blue. Hence we are accustomed to mingle white or grey with these colours, when it is requisite to employ them alone over large surfaces, so as to soften and render them more supportable. Combinations of two of the simple colours,—the third, which would render them complementary, being deficient,—are the most offensive to the eye: for instance, combinations of yellow and red, blue and red, or yellow and blue. In these combinations there is complete disharmony; while, in the association of two colours, of which one forms the transition to the other, there is neither harmony nor disharmony. Such colours are indifferent to each other, as yellow to green, red to orange, or violet to blue. The disharmony between two colours may, however, be removed by the interposition of a third colour which is the harmonic of one of them, and is indifferent with relation to the other. We have examples of this in such combinations as red, green, and yellow; yellow, violet, and red; blue, orange, and red; or red, green, and blue, &c.

I have only briefly adverted to the æsthetic branch of the theory, to draw your attention to the central principle of "balance" as the basis of the harmony of colour,—indeed, of all harmony; and to notice that the mode of neutralizing discords in music is another fact which links the two theories together, as it is similar to that by which two disharmonic colours are brought together by the intervention of a third, with one of which it harmonizes, while towards the other it is indifferent.

In the facts which I have collected and grouped together, it will be seen that both light and sound can be respectively produced in the eye and the ear by the same mechanical means, by a blow, by pressure, by the arterial pulse, by electricity, by narcotics; that the remarkable phenomenon of *interference*, by which two rays either of light or sound may be made to neutralise or extinguish each other, is common to both; and that the theory of light which has the widest acceptance is that which makes its propagation analogous to that of sound. The wonderful parallelism between the two phenomena "can hardly leave," as Sir John Herschel remarks, "any reasonable doubt of their ultimate coincidence in one common phenomenon, the vibratory movement of an elastic medium. Every colour, therefore, as every note, will be dependent upon the relativity of the vibrations which produce it, or of the states of the senses. This is very notably confirmed by the experiments in which the same grey spot successively assumes every hue, and by the phenomena of the complementary spectra and shadows. But the very principle of compensation which arrests our attention in studying the ocular spectra connects them with the larger physical phenomena of the solar system in which the law of compensation would appear to be eternally fixed. The law may be thus stated: every departure from a mean state on one side, must be compensated by an equal but opposite divergence on the other. And this would make good colour and good music to consist, as we feel they do, either in preserving an even temperament or in restoring a disturbed balance by means of compensation. But whether we consider colour in its physical aspect as the relativity of vibrations on or in the retina, as produced by mechanical pressure, or in the phenomena of compensation, it must be in the abstract just as music is, a science of relative proportion. And all proportional relation is comprehended in the movement of that instrument which I have called The Balance of Nature.

If the external cause of colour be merely

mechanical vibrations, how inconsistent is it with the received theory to dispute whether there be three or more primitive colours, and to talk about a substance absorbing certain colours whilst it reflects another, or of different coloured rays. For, according to the received theory, or any theory which has been entertained, there are no *objective* colours to absorb, but only various mechanical undulations or impulses. It is, therefore, more reasonable to suppose that substances respond the illuminating vibration with which their structure is in unison. And if an illuminating ray be constituted of mechanical undulations, it is also reasonable to suppose that it might be made to produce every colour on the retina by the raising or lowering of the velocities and magnitudes of its vibrations, and to establish the monogenesis of colour from force. I believe it will ultimately be discovered that colours are produced by modifications of the normal or mean undulation which produces the sensation of white light. That the illuminating vibrations are not conveyed by a continuous ether, but by transferred undulations, just as the pulses of a musical string are through various materials, and that transparency consists in their true and direct transference by certain substances.

There are still remaining, however, a few words to our summing up. Science very often speaks too confidently as if it had the power to penetrate causation, physical and physiological; but the truth is, in this respect, our knowledge is but inference at best. Science, all the time she fancies herself occupied with the study of the external is only contemplating the world in sensation, in its appearance to human nature, and the fundamental form of sensation is quantity. The science of proportion, therefore, is that which underlies all others; and when all our knowledge shall have assumed the form of correct quantitative statement, it will have attained its higest degree of certitude.

W. CAVE THOMAS.

PARIS.

THE Palais de l'Industrie, at the Champs Elysées, has been conceded, for a term of five years, to the French Hippic Society. M. Dutron, architect of the building, is arranging the ground floor so that in one stable, or in two at most, the five hundred and odd horses can be lodged, to which the above Society purpose distributing training prizes to the value of about 2,400*l*. The contest is to take place from the 1st to the 15th of April.

At the New Opera-house the triangular building in which the stage will be installed has been roofed in. From the floor of the cellars to the roof of this portion of the Opera-house the height is 328 ft. Powerful machinery is to be used for working the scenery. The exterior sculptures of the ground floor are being terminated.

The immense ecclesiastical printing establishment of the Abbé Migne, at the Chaussée du Maine, Paris, has just been destroyed by fire. A portion of his library and furniture, also the paintings of the church, were preserved; but all the other valuable documents and MSS. are destroyed. The loss is irreparable. He had revived the works of the ancient churchmen in more than 500 volumes in 4to., and the fruits of his life's labour disappeared in a few hours. The establishment was the largest of its kind in the world; it was insured in thirty-five offices, but as they insured only for half the value the loss is immense. Upwards of 300 persons are thrown out of work, most of whom have families. The loss of the materials destroyed is over 120,000*l*. Several thousand volumes have also perished.

The mairie of the fourth arrondissement, that of the "Hôtel de Ville," is now finished, and is one of the new municipal establishments of Paris worthy of attention. It is from the designs of M. Bailly, architect of the Tribunal of Commerce, and covers an area of 24,748 square feet. Its principal entrance is on the Place Saint-Jean, and it is limited on its other façades by the Rues de Rivoli, Vieille-du-Temple, and Saint-Antoine. Access is given by three large bays; the centre one leads to a fine staircase, of triple revolution, preceded by a spacious vestibule. By the other two bays we enter into a court surrounded by closed galleries, serving as waiting-rooms, &c. On the *entresol* are placed the public library, engineers' offices, &c. Above are established the principal civil services, secretary's offices, &c., and the marriage saloon, which is well ornamented, and furnished with a magnificent marble chimney. There is also another saloon, well decorated, for various purposes, distributions of prizes, exhibitions, concerts, charity balls, &c. It is 124 ft. 6 in. long, by 33 ft. wide, and 24 ft. 6 in. high; it is lighted by seven large windows, with stone mullions and transoms, like those of the Middle Ages. Entrance is given to this saloon by five great doorways, the woodwork of which is of stained oak.

In the line of the Pont de Solferino, the clearance for the new street leading to the Rue de Grenelle St. Germain progresses rapidly. It will throw open the building called the Palace of the Legion of Honour.

At the ancient Louvre, under the gallery of Apollo, is the rich restoration of the ancient paintings of the apartments of Anne of Austria, which were given by the first Empire to the Museum of Antiquities. It is on the southern side of this portion of the Louvre that we see the balcony from which Charles IX., on the 24th August, 1572, fired at the unfortunate Huguenots who were swimming across the Seine, to escape the massacre of St. Bartholomew. They are occupied at present in arranging in these magnificent saloons, now restored to their primitive state, the busts and antique bas-reliefs they contained, adding to them those from the splendid collection of Compana which the French Government purchased seven or eight years ago. When completely arranged, this museum will be unequalled in the world.

The iron framework of the roof of the new wing of the Tuileries is being put in place, and will be soon finished. Also the Emperor's entrance-gate has been finished and decorated with two life-sized lions of bronze placed upon the two pedestals which precede it. They are by the sculptor M. Barye.

We have already mentioned that the Hotel Carnavalet, in the Rue Culture-Sainte-Catherine is being restored and enlarged, so as to form a municipal museum containing an archæological collection representing the six great eras of the town of Paris:—1. The primitive and obscure epoch of ancient Lutecia; 2. The Gallic and Gallo-Roman period; 3. Moyen Age; 4. The Renaissance; 5. The seventeenth and eighteenth centuries; 6. The present epoch. Each period will be represented by plans, instruments, tools, utensils, objects of art, design and geology, maps, human and monumental *débris*, fragments of architecture, &c., collected from excavations for foundations, past, present, and future. The present epoch will be represented also by specimens, copies, sketches, facsimiles of all that the monuments of Paris, churches, edifices, &c., contain most remarkable in artistic work, paintings, medals, decorative paintings, sculptures, statues, and curious works of all sorts.

THE PARIS EXHIBITION BUILDING.

ON the 13th ult., the Exhibition Palace of the Champ de Mars was "knocked down," by adjudication, to M. Menot, ainé, whose offer was the highest. Viewed from the exterior, the building appears intact, but the interior has been completely cleared of its contents, and the galleries are attacked on all sides, so that they present the appearance of a scathed forest; the central garden is bare, but the central pavilion, in which the weights, measures, and coins were displayed, is still upright. The great machine gallery remains untouched, as far as its framework and roof are concerned, but the floor has been levelled, and all machinery has been removed.

Outside the building, the Champ de Mars presents a singular aspect; the red iron light-house is nearly taken down; each plate is carefully packed and placed upon a lighter, for its ultimate destination, Les Roches Douvres. Austria has removed all her own from the Park; Spain is at work dismantling the great pavilion; Switzerland, Sweden, and Russia have not as yet attacked their picturesque pavilions and chalets. Towards the north-west, or Asiatic part of the grounds, we observe many Turkish and Egyptian buildings yet standing, but the details of the latter, sphinxes, &c., are being demolished, and the pavilion of the Viceroy is attacked. The Chinese and Tunisian palaces, at this extremity of the park, seem to be the only buildings hitherto respected. The chimneys for the engine boilers are all down, and the reserved garden presents a piteous aspect.

The sale of all the materials forming the *ensemble* of the Exhibition in the Palais and park was effected at the "Cercle International," on the grounds, and several days in the week were devoted by the Commission for this work. All this enormous mass of material passes away in large lots. In a very short time hence every lot will be sold, given up, and taken away, so that no trace will remain of the great Universal Exhibition of 1867, unless some spirited capitalists create a reminiscent building, like our Crystal Palace at Sydenham, of 1851, and that of Muswell-hill, of 1862.

TRADE UNION PERSECUTION.

SIR,—Can you give me the addresses of any respectable builders in or near London, who employ non-union men? I want to get work for a young man, a bricksetter, who has been positively persecuted by union men. He is remarkably steady, sober, honest, and a good workman. I had him employed on a parsonage which I am erecting, and all went on comfortably till one or two unionists, and some of them the worst hands on the work, threatened a strike, and the contractor was compelled to sacrifice the young man, whom he had from feelings of personal friendship and esteem engaged, and with whose work he expressed himself perfectly satisfied. I got him work in Lancashire, but the evil spirits followed him there also, and all because he did not begin to work until after he was fourteen years of age, while the contractor, who was employing him, had himself been a silk weaver, and did not learn his trade until after he was twenty-one.

In trade unions I see no objection so long as they are carried on with honesty and fair dealing, but I consider this an act of heartless, selfish robbery, to say to a young man, you shall not earn your bread by your trade, although you are a better hand, it may be, than many who can show their card. These brutes, for I can call them nothing else, are invariably the most ignorant, drunken muffs in the trade. By your helping me in this matter, you will do an act of charity.

A COUNTRY CLERGYMAN.

*** One of our readers may, perhaps, need a bricklayer. We have the writer's address.

THE LEEDS WATERWORKS.

THE first portion of the extensive corporation scheme by which the waters of the Wharfe are to be substituted by those of one of its tributaries,—the Washburn,—in the supply of Leeds, has been commenced, and there is a prospect, should the works proceed favourably, of the Wharfe being abandoned during the ensuing autumn, though several years will elapse ere the scheme in its entirety, with its extensive reservoirs in the upper reaches of the picturesque vale of the Washburn, will be completed.

The water-shed impounded by the new Waterworks Local Act it is estimated will yield about 23,000,000 gallons daily. The first part of the scheme is to pump from the Washburn at the point of its junction with the Wharfe, the 6,000,000 gallons now obtained from the larger river. This is to be accomplished by laying a 27-inch cast-iron conduit from a dam at the foot of the Washburn to the present pumping station at Arthington, a distance of about two miles. The conduit, after leaving the Arthington works, will be continued on till it meets the waters of the Washburn. For the purposes of this conduit, Mr. Filliter,—who has the exclusive supervision of the works from Arthington to the foot of the Washburn, in connexion with the pumping part of the scheme, while the reservoirs will be constructed under the joint management of Mr. Filliter & Mr. Hawksley,—has had the pipes cast specially in 12-ft. lengths, with the sockets downwards, after which they were coated, both inside and out, with a black glaze, this having the effect, to a considerable extent, of preventing corrosion, while the greater length,—pipes for similar purposes being usually 9 ft.,—makes fewer joints requisite, and the leakage consequently smaller. Of the 1,000 pipes, which have been cast by Messrs. Hopkins, Gilkes, & Co. (Limited), of Middlesbro', whose contract was for 5,630*l*., 900 have already been delivered. For this portion of the works, which Mr. Filliter is sanguine will be completed in about six months, the sum of 15,000*l*., in addition to the compensation,—

45,000*l.*,—to be paid to Mr. F. H. Fawkes, has already been granted by the Council.

The more important part of the scheme, however, is that comprising the reservoir works up the valley for providing the supply of the additional fourteen millions of gallons, which it is estimated will be required in Leeds for daily consumption by the end of the present century, and for sending down the compensation waters to the neighbouring landowners. The plan shows that four reservoirs are contemplated, one of these being situated at Lindley Wood, about two miles from the foot of the Washburn, two others about midway up the valley, at Fewston and Swinsty, and a fourth about three or four miles from the head of the valley. The following figures represent the approximate dimensions of the various reservoirs:—

It is estimated that when the whole of the works have been carried out there will be provision made for a supply for 180 days.

As to the existing works of the corporation, the store reservoir at Eccup is about 40 acres in extent, and contains about 240,000,000 gallons, and the Woodhouse supply reservoir contains about 6,000,000 gallons, being only one-sixth more than one day's consumption. At Weetwood are the filter-beds of sand, which cover about 2¾ acres, and at Headingley the pumping-works for the high-level districts of Headingley-hill, Chapeltown, Bramley, and Wortley. Two engines send to the higher parts of the borough nearly 1,000,000 gallons per day. In addition to these works there is a small reservoir at Bramley which holds about 2,000,000 gallons, and another, very much smaller, at Beeston.

	Lindley Reservoir. (Compensation and Supply.)	Swinsty Reservoir. (Compensation.)	Fewston Reservoir. (Supply.)	Thruscross Reservoir. (Supply and Compensation.)
Area of Watershed	21,700 acres	17,000 acres	13,000 acres	4,500 acres
Capacity of Reservoir	700,000,000 gals.	960,000,000 gals.	870,000,000 gals.	540,000,000 gals.
Area of Water Surface	117 acres	156 acres	156 acres	50 acres
Depth of Water	60 feet	60 feet	60 feet	95 feet
Height of Embankment	67 feet	67 feet	68 feet	102 feet
Height above Sea Level	300 feet	450 feet	500 feet	777 feet

SOUTH KENSINGTON PARK DRIVE.

GREAT excitement amongst the residents of this district has been caused by the temporary stoppage of the marginal Park road between the Queen's and Prince's gates. The grand quadrilateral of the Horticultural grounds being now completely surrounded by first-class mansions, has become the resort and abode of distinguished and wealthy families, who, having purchased or built their houses on account of the fine open roads, the vicinage of the Park and Gardens, and the direct access thereto by the Queen's gate, at the end of Albert-road, feel a dread lest these gates, which, by permission of the Commissioners, were erected by and at the expense of Mr. W. Jackson, should be summarily closed against carriages.

This carriage-way, in a direct line of about a mile and a half from Hyde-Park corner to Kensington, formed the most agreeable route of access to town, avoiding the not very pleasing defile opposite Knightsbridge Barracks, and offering the amenities of a seemingly rural park with wide waters and most effective floral ornamentation. The South Kensington Museum adds doubtless to the attractions of this quarter, and the new Hall of Arts and Sciences will, when completed, confer on it additional lustre; but its chief value is from propinquity to the Park and the free intercourse by the marginal Park road, which will continue to be its first recommendation.

Some little deviation of the drive has become necessary at the base of the Albert Memorial, where probably another carriage-entrance may be opened, opposite to the Rotunda of Arts and Sciences; but on this side, within the distance of one mile, there are already four open carriage-gates, and one other, shut up, opposite Prince's Gardens.

For the public in general a great accommodation was conceded by the opening out of a road for cab traffic from Victoria-gate, Bayswater, to Kensington-road. This gave an improved route of communication between the important N.W. and S.W. districts; but the line which takes a southern direction to the Magazine turns off westward thence to the Albert-road, Kensington, diverging at least one-third of a mile out of the right line, which should have had issue at the gate facing the Exhibition-road. As an easy and direct intercourse between Bayswater, Brompton, and Chelsea, this line would be of general public utility; the only lines of access open to public conveyances previously having been by Park-lane,—a detour of over one mile and a half.

By adopting the suggested roadway, access to Kensington would be attained by a more level road across the plateau of the Park angle, at a distance increased by 100 yards only; whilst to all other points half a mile would be saved, and a great improvement made as regards the flower-walk of Kensington Gardens.

That an open communication should exist between the noble memorial to the regretted Prince and the Hall of Arts and Sciences suggested by him, is a proposition that meets universal concurrence; but that the beautiful drive extending from Hyde-Park corner to Queen's-gate, Kensington, should be curtailed, or that direct access from Albert-road should be closed against carriages, would annoy and incommode the residents of the fine ranges of South Kensington, and damnify their property.

As to the Park rides, equestrians have much to be grateful for towards the Commissioners, who, in addition to the mile-and-half course of Rotten-row, have opened out another course of equal length, completely encircling Hyde Park. Those also "who put their trust in chariots" have free circulation over well-kept drives, which command the best views of wood, water, and landscape; whilst all the borders within view are decorated with luxuriant blossom, tended with a skill and care, first introduced by official authority. With these experiences the residents of South Kensington may, we think, rest content, and feel assured that no change will be made in this angle of the Park which will not be as conducive to pictorial effect and popular enjoyment, as was the demolition of the old Cavalry Barrack and substitution of a Fairy Garden.

A COMPETITION ABROAD.

THE designs sent in for the competition opened for a public monument, commemorative of the victory obtained at Callao over the Spaniards by the republics of S. America, were examined on the 24th February last. The jury, presided over by M. Gleyre, was composed of MM. Le Duc and Duban, architects, Eug. Guillaume and Perraud, sculptors, both of the Institute. The design, selected to be classed in the first rank, emanated from M. Guillaume, architect, and M. Cugnot, sculptor. One of the designs sent by MM. Davioud, architect, and Cugnot, sculptor, obtained the place of second rank. Lastly, No. 11 of M. Simonet, architect, and Elias Robert, sculptor, held the third rank. Twenty-six designs were sent for competition.

FROM IRELAND.

Dublin.—The directors of the Industrial Tenements Company, and some personal friends (shareholders), have entertained Mr. Henry M'Clean, J.P., their chairman, at a banquet, in the Gresham Hotel, on the occasion of the new model dwellings, in Meath-street and Earl-street, being opened. Sir John Bagot occupied the chair, and Alderman Gregg the vice-chair. The new block of buildings contains 120 rooms, with every arrangement, it is said, for comfort, health, and decency. The Vartry water is laid on to every story up to the attics.

Killarney.—The Franciscan (R. C.) Church at Killarney has been consecrated. The church is named the Holy Trinity. On the 17th March, 1864, the foundation stone was laid. The designs for the building were furnished by Mr. J. G. M'Carthy, of Dublin; and the style of architecture is as nearly similar as possible to that of Muckross Abbey, which was a monastery inhabited by the Franciscan Order in the year 1340. The new building was commenced through the exertions of the Rev. Mr. Patrick, prior of the order, and when the edifice was only seven feet above the ground that priest died. This caused a check to the progress of the building. However, the works were resumed by the contractors, Messrs. Barry & Doyle, and have now been brought to completion. The building has not much pretension to architectural beauty, the intention evidently being to make it as substantial as possible, as well as comfortable, for the congregation. Its length is 165 ft., and width 35 ft. The high altar has not yet been completed. It is intended to erect two side altars, to be dedicated to the Virgin Mary and St. Anthony. A sum of 4,000*l.* has already been subscribed towards defraying the expenses of the church, but it is believed that before it is completed an equal sum must be contributed.

BATH ABBEY RESTORATIONS.

AT a vestry meeting recently held, the parishioners unanimously resolved,—

"That the churchwardens of St. Peter and St. Paul, Bath, be authorised to apply to the Consistory Court at Wells for a faculty to carry out the following alterations within the parish church, viz., to take down and remove the organ from the present gallery and re-erect the same in the north transept; to take down and remove the pulpit, reading-desk, clerk's desk, galleries, pews, and all other fittings now erected and being in the choir, and to take up the flooring of the said choir and erect the pulpit, reading-desk, clerk's desk, pews, and sittings in the nave, and relay the floor of the choir with the same stones; to remove the stone screen from the middle of the said church, and re-erect the same at the west end thereof, or some other convenient place, or otherwise; to take up the flooring of the nave, and relay the same with the stones taken up; to erect pews and sittings in the choir, nave, and transept; to use and employ any of the materials removed in the refitting of the said choir and nave, or otherwise to sell the same, and apply the proceeds in and towards the expenses of such refittings; to remove all tombs, monuments, and tablets now erected, and being in and against the walls of the said church, and, without destroying or defacing any inscriptions thereon, to reduce the same in size and re-erect and fix the said tombs, monuments, and tablets in some other appropriate and convenient place or places within the said church; and to remove, alter, and re-erect the rails of the chancel of the said church."

The groining of the nave is proceeding satisfactorily, but subscriptions to a considerable amount are still needed to complete this portion of the work. The roof and clearstory windows have been repaired: the transepts are nearly finished, and preparations may now be made for the removal of the organ to the north transept as suggested by Mr. Scott and approved by Mr. Hill. The stained-glass window which is intended to be placed in the south side of the nave in memory of the late Mr. J. H. Markland, D.C.L., has arrived; and the glass for another window is also in the church, leaving only one vacancy in that portion of the building.

THE PUGIN TRAVELLING STUDENTSHIP.

ELEVEN candidates sent to the Institute applications, drawings, and testimonials for the Pugin Travelling Studentship of the current year, and the studentship has been awarded by the council to Mr. C. Heuman, jun., of 7, Bedford-place, Croydon.

WARMING AND VENTILATING.

DR. HAYWARD, of Liverpool, has recently made some arrangements in his own house with a view to warming and ventilating, which seem calculated to be efficacious, and recently invited several persons to examine them. The air is received in at the basement, through gratings from the street, into a chamber, where it is heated by means of hot-water pipes connected with a stove in another department. The warm air flows naturally upwards through other gratings into a lobby on the next floor, from which it is diffused into all the chambers on that floor, which are connected by gratings with the central lobby. A further draught of air is carried to a lobby on the next floor, and diffused in like manner, so on from lobbies into chambers, until we reach the top of the house, the temperature, of course, decreasing slightly as it rises. In each room, over the chandelier is another grating, into which the foul air flows, and is carried up from each room through a pipe until the entire foul air of the premises is concentrated in a small chamber at the top of the building. This chamber is connected by a shaft with the kitchen chimney, and the foul air is drawn down through this shaft, and escapes from the chimney shaft, through flues which

run parallel with the smoke flue of the kitchen. Dr. Hayward claims by his arrangement to always ensure an equable temperature either in summer or winter, and to obviate all the ordinary draughts of houses, so productive of cold and worse evils. If a heavy and cold wind blows the valves for admitting the air at the basement can be closed, and if it is warm they can be opened according to circumstances. The expenditure of fuel for heating the air, a thing accomplished by contact with hot-water pipes in its first stage of flow towards the upper chambers, is trifling, and is much more than saved by the diminution in the quantity of coal necessary for use in the grates. In summer, by the aid of ice in what are in winter the heating chambers, the air can be brought to any temperature.

USE OF HOME-GROWN TIMBER.

BIRMINGHAM ARCHITECTURAL SOCIETY.

AT a meeting of this Society, Mr. George B. Nichols, of West Bromwich, read a paper as an introduction to a more detailed discourse to be delivered on a future day before the same society, on "The adaptability of our own home-grown timber for internal purposes." Mr. Nichols said the subject had been forgotten by the profession for the last half century at least. The timbers of foreign countries having been brought rapidly into use on account of their adaptability and cheapness, the country had been led to depend entirely upon them, and home-grown timber had been allowed to degenerate, and become of no use except for inferior purposes. The beauty and adaptability for internal purposes of many of our home-grown timbers had been overlooked. He laid before the society samples of home-grown timber, "with a view to the introduction of a variety in design for internal work, when occasion may offer for an improvement upon the ever monotonous painting and graining." The samples he wished to bring under notice included "the vine prop alone," "the poplar never dry," "the builder oake, sole king of forrests all;" "the willow, worne of forlourne paramours;" "the yew, obedient to the bender's will;" "the birche for shaftes;" "the warlike beech;" "the ashe for nothing ill;" the maple, the larch, the Scotch fir, the lime-tree, the wych elm, the sycamore, the cherry-tree, the alder, the howler, the hornbeam, the apple-tree, the plumb-tree, the walnut, and the chestnut. He hoped the subject of internal decoration would be considered, with a view of bringing out in their natural state the material to be dealt with, relying on the beauty of nature for effect, wherever it could be obtained by judicious treatment of form and colour. He presented the samples to the society for the museum.

THE PROPOSED HOSPITAL FOR NEWCASTLE-UPON-TYNE.

SEVEN or eight years ago it was proposed to erect a hospital in connexion with the Union Workhouse, Newcastle-upon-Tyne; but, for wise economical reasons, that which was necessary then has not been erected yet. An opportunity, however, occurred—an opportunity in such excellent harmony with guardians' economy—that the hospital committee could not let it pass without making another effort to obtain the long-neglected requirement. According to the testimony of one gentleman, *the plans had been drawn by an inmate!* If this should turn out to be correct, surely the Newcastle guardians, who are about to expend from 10,000*l.* to 12,000*l.* over an erection to accommodate 250 patients, may justly be blamed for so recklessly risking the ratepayers' money, as they appear to have been accused of doing by some of their co-guardians. It is but fair, however, in explanation to say that another architect—not an inmate—has been requested, on the understanding that his commission should be reduced to 2½ per cent., in consideration of the work previously done, to revise and improve the designs of the hospital according to the matured instructions of the hospital committee. And it was on the occasion of the approving of these designs that what the local papers call a "scene" took place in the board-room of that august body. One gentleman, who advocated the pavilion plan, complained of the want of through-and-through ventilation,—of "outshoots" in the shape of large day-rooms, "which prevented the air from going all round the building,"—of the situation of the water-closets, which were "close to the wards, and under certain circumstances, which were of very frequent occurrence in all hospitals, impure air therefrom would readily get into both wards,"—and also of the position of the building upon the site, owing to which "some of the windows would face the north, and consequently be entirely deprived of sunshine." The chairman of the committee, in reply, said that "although several of them might have objections to certain portions of the plan, yet they considered it was *a compromise of their various views;* and that, having determined on the shape and position of the hospital, all they had to do was to give an architect instructions how to carry them out; and a better course for the interest of the ratepayers could not be pursued than the one they had followed, either by having competition or any other mode of getting plans."

After all that has been written and said upon the question of hospital construction, we fear the Newcastle guardians are behind what they ought to be as to the best mode of securing the best hospital for the least money.

THE PEABODY MEMORIAL CHURCH IN MASSACHUSSETTS.

THIS church, in Georgetown, Mass., erected as a memorial of the mother of George Peabody, by her son and daughter, has been dedicated to divine service. Mr. Peabody, who was present when the corner-stone was laid, in September, 1866, was not able to attend the dedication. A letter from him was read, bearing date London, Oct. 18, 1867, and addressed to the members of the Orthodox Congregational Church in Georgetown. After stating that his sister, his "faithful coadjutor" in the enterprise, had informed him that the church had been satisfactorily completed, he adds:—

"In the building of the church we had a twofold object: first, its consecration to the memory of our beloved mother; and, second, its dedication to the worship of Almighty God, in its simple purity, according to the evangelical faith, as acknowledged and accepted by our dear mother, and as recognised by the Orthodox Congregational Churches of New England. On the completion of the building, its use will be legally conveyed to you and your successors, in trust, subject to the following conditions."

Then follow the conditions, which relate to the purposes of the edifice, its repair, and that of the memorial tablets, &c.

MR. PEABODY'S GIFT.

THE following results are shown in buildings at Shadwell and Islington for the year 1867:—

—	Cost.	Gross Rent.	Expenses.	Net Rent.	Interest from Net Rent.	Expenses on Gross Rent
	£	£	£	£	prcnt.	prcnt.
Spitalfields, for land & buildgs.	27,215	1,050	360	690	2·53	34·28
Islington	40,397	1,699	670	1,029	2·48	39·43
Totals.....	67,612	2,749	1,030	1,719	2·5	37·44

Spitalfields and Islington have been fully occupied. The annual expenses are taxes, rates, insurance, alterations, repairs, and collection. Fractions of 1*l.* are omitted. The net rents invested annually at 3 per cent. per annum would reproduce the whole original outlay in twenty-seven or twenty-eight years. (See *Builder* of 22nd. ult.) T. H.

A THOUGHTFUL ACT OF MASONS.

SIR,—I shall feel obliged if you will kindly insert the following lines in your valuable journal, which will set forth the manly character of the Cornish masons. When trade was prosperous, the masons of Penryn asked for an advance of wages, which they obtained. Now, when trade is dull, they have sent a memorial to the firm of Messrs. Freeman, beseeching them to deduct 6d. per day off their wages. These men appear to me to be free and use their own judgment. Such a case as the above, perhaps, was never known before. WILLIAM CROSS.

The Prince Consort Memorial, Hyde Park.

THE DESIGNER OF THE PENITENTIARY, MILLBANK.

"Dead sinners, as well as saints, should have an advocate, although not del' diavolo."

SIR,—In the list of buildings designed by the late Sir Robert Smirke, R.A., published by the Institute, the fourth is the General Penitentiary, Millbank, London. This was designed, with the exception of the gateway, by a Mr. Williams, formerly teacher of military drawing in the Military College (see the style, and doubt it if you can). The writer assisted Mr. Williams in making the drawings in 1813. They were successful in the competition, and gained the first premium, and the building was carried out from them, *except the gateway.* This was designed and built by the late Mr. Thos. Hardwick; but it failed, and Mr. Smirke was called in, who put in a new foundation of concrete. The general building was not, that I am aware of, touched by him, and is not his, but Williams's design.

AVVOCATO DEL' DIAVOLO.

*** Making inquiries of those who know the circumstances, we are informed that when the foundation of the gateway and other parts failed, the work went into the hands of Sir R. Smirke, somewhere about 1816. The crippled pentagons were taken down, and the whole prison was rebuilt under Sir Robert's direction. Possibly the central part, round which the pentagons are arranged, may not have been rebuilt, but of this our informants are uncertain. Much constructive skill was shown, and it affords one of the earliest examples of the use of concrete in England (just fifty years ago). We have always understood that the radiating principle was devised by the late Sir S. Bentham. Lady Bentham, when alive, wrote several letters, in our pages, to assert it.

ENGRAVED LETTERS ON MARBLE.

YOUR correspondent "F. M." asks the best and most durable method of preparing engraved letters on marble or stone to receive gold-leaf.

The following will answer the purpose:—In half a pint of hot turpentine dissolve 2½ oz. of gum dama and 1½ oz. of *best* white wax; when cold, give the letters one or two coats of this, allowing a day between each coat to dry; then gild with double-thickness gold-leaf in the usual manner. It will not crack either indoors or exposed to the weather. THOS. KERSHAW.

HERNE BAY PIER.

ABOUT four-fifths of this pier are available as a promenade. Possibly an expenditure of 1,500*l.* to renew the cross planking of the platform and some longitudinal timbers would at once enable the pier to be opened.

Nothing can be more absurd than the barriers erected at the *entrance* to the pier, which *is boarded in;* and nothing would be easier than removing them at once two-thirds of the distance down the pier. Anything more discreditable to the town than the closing of this pier, when a few slight repairs could at once obviate its being barred to the public, cannot readily be conceived.

There may be defects in the piling, but to no considerable extent, and none which a little management could not overcome. The bays or spaces between piles are small, and might easily be trussed where defective. It may readily be imagined the money loss that has accrued to the enlightened inhabitants. PAULATIM.

ARCHITECTS' CHARGES.—RANDAL *v.* GRAY.

SIR,—Having seen a letter from Mr. W. Butterfield, published in the *Builder*, and on the subject of a trial concerning architects' charges between Randal and Gray, and having been present at the trial, I beg leave to state that the clerk of the works called as a witness on the trial, and who, Mr. Butterfield says, is in his employ, distinctly stated in court that he was employed by a lady, whose name he gave. What right, therefore, Mr. Butterfield has to interfere either with what he says or does after hours, or the employment of his time in any way, does not appear.

If Mr. Butterfield would think for a moment, he would see that had he endeavoured to prevent the appearance of the clerk of the works on the trial a subpœna would have overcome all such "arbitrary interference." As to the clerk of the works having given "incorrect evidence" and speaking of "that of which he could have no accurate knowledge," I can only say he particularly stated himself to be only a clerk of the works. He said he never knew architects to charge more than a commission of 5 per cent., but he could not say they did not.

Any one present could see that he was called for the purpose of proving neglect in the carrying out of certain works spoken of in the trial. Mr. Butterfield's name only came out by the attorney for the plaintiff asking (by the prompting of the plaintiff), if the church restoration, superintended by the clerk of the works, was not being carried out under Mr. Butterfield. The answer was, "I

do not wish to mention Mr. Butterfield." Plaintiff's attorney then said, "Oh, but we want to hear all about him;" but on the attorney for the defendant speaking to him, no further mention of Mr. Butterfield's name occurred.

Mr. Butterfield's giving an opinion as to the charge not being an unreasonable one, seems to me uncalled for, as he had no concern in it.

Mr. Butterfield seems very sore at the idea that a wrong impression as to his charges has been given to the public. I can only say, if the result of this trial be to induce either Mr. Butterfield, or any other architect, to state his charges before undertaking a work (which is not the universal custom), it will have done some good for the public. I enclose my card. ONE PRESENT AT THE TRIAL.

FLATS *versus* LODGINGS.

SIR,—Will you allow me, through your paper, to call the attention of builders and owners of house property, to what is considered by many a great want in our metropolis, more especially at the west-end? I allude to what are called flats, such as those in Victoria-street, Westminster, and of which many exist in Paris, to the great convenience of many persons who do not wish, or cannot afford, the trouble and expense of a large establishment. You are aware that many families have been obliged to reduce their establishments owing to the recent failures in railways and other securities. Now, people who have been long accustomed to the comforts of their own house, find lodgings a very poor substitute, whereas by taking a flat, they would have all the advantages of their own house, and would certainly not require more than two servants, thus saving very considerably in wages, &c. Victoria-street, Westminster, is not exactly the place one would choose for a dwelling in, but on the outside of the park, in Tyburnia, I believe, flats would be eagerly sought after. There are many rows of houses in that neighbourhood still unoccupied, and others in the course of erection, which might be converted into rooms such as I mention, and would thereby be conferring a great benefit upon many, I firmly believe, and amongst others yours,

PADDINGTON.

*** A block of houses to be let in flats, and called "Belgrave Mansions," has been built on Lord Westminster's estate.

THE LOSSES OF IRONMONGERS.

SIR,—It is an every-day practice for tradesmen in the City who have what they call a country house,—that is, a house situated about five miles from St. Paul's,—to give orders for a competent person to go and inspect premises, make estimates and drawings, say, for a kitchen range, a warm bath, &c. After calling several times at the City address the ironmonger finds that about half a dozen engineers and ironmongers have tendered for the job, which was not named in the first order.

I certainly think that every ironmonger should in these cases send in his account for estimates and loss of time. He should in all cases ask if it is to be a competition job?

S. C.

CASES UNDER METROPOLITAN BUILDING ACT.

DISTRICT SURVEYORS' FEES.—At the Clerkenwell Police Court, Mr. A. N. Bryett, builder, of St. James's-road, Holloway, was summoned, before Mr. Cooke, by Mr. John Turner, one of the district surveyors of Islington, to show cause why he refused to pay the sum of 15s. for surveying the erection of a cellar attached to a bakehouse, erected after the roof of the bakehouse had been covered in.

Mr. Cooke, the case having been heard at length on a previous occasion and adjourned, delivered a lengthened judgment, in which he pointed out that where an addition to a building was not contemplated and commenced before the main building was covered in, it could not come under the "additions" referred to in the Act, covered by the first notice and first survey; but was an addition for which an additional notice must be given, an additional survey made, and an additional fee paid. He thought the builder had a right to say that the cellar now in dispute formed part and parcel of the bakehouse, and was intended to be included in the original notice. The wall of the cellar formed part of the bakehouse, and though there was an external and not an internal communication, he thought that that did not make it a separate building within the meaning of the Act. The cellar being, therefore, a part of the bakehouse, the surveyor was not entitled to another fee.

BUILDING WITHOUT ARCHITECTURAL SUPERVISION.

DR. LANKESTER has held an inquest at the Torrington Arms, Finchley, on the body of George Moore, who was killed by the fall of a part of the building which he was working on. The evidence showed that the house in question was intended for a public-house, and an effort was being made to get it finished in time for the forthcoming licensing day. In order to obtain large cellarage room the stacks of chimneys were not carried down to the ground, but were built projecting from the party walls, which were 9 in. thick. As soon as the centering was removed, the wall and chimney fell, burying the deceased and suffocating him. Mr. Richard Wale, an architect, who was examined, said that no architect could have designed, and no competent builder could have carried out, a building on the plan of the one which fell. It could not possibly have stood. If it had been propped up for twelve months, and the supports then removed, it must have fallen. The dead weight upon the structure was altogether too great for its capacity. If the chimneys had been carried down to the ground the wall would have stood. He had been in his profession for thirty years, and had never seen a building attempted on such a plan before. The jury, after returning a verdict of "Accidental death," passed a resolution declaring their opinion to be that sufficient care had not been taken by the owner of the building to have it constructed properly, and that the said owner and his advisers and assistants were consequently culpable.

PARISH CHURCH BELLS.

IN the *Builder* of the 15th inst., calling attention to a bell weighing fifty-five cwt., recently cast for the new church at Woburn, I said, "It is the heaviest parish church bell in Great Britain."

Your correspondent "Verus," observes, in reply, "I venture to doubt this, by 'fancying' that there may be several latent heavy bells of little more than local cognizance and fame. There *was*, forty years ago, a statement of a bell at *some* parish church in Gloucestershire weighing 8,000 lb."

I may remark, however, that whatever there *was* in Gloucestershire, or elsewhere, forty years ago, is altogether beside the point.

But your correspondent goes on to say, "There is a village tenor of six in Oxfordshire, I am pretty certain, near Witney (else Banbury), 'undoubtedly' weighing fifty-six cwt."

Now, I venture to affirm that the heaviest village bell in Oxfordshire is the tenor of a peal of five in the tower of St. Mary's Church, Bloxham, near Banbury. It is a noble bell, remarkable for dignity of tone; but its weight does not exceed 34 cwt., according to my estimate, while its reputed weight has never been above 36 cwt.

"Verus" states also that "there is a tenor at the fine church of Felversham, Beds, believed on good authority to weigh 50 cwt."

Here, then, is another strange mistake. The reputed weight of this bell is only 27 cwt., and, like many other tenors, it is, I know, much overrated.

It is, therefore, evident that your respected correspondent has failed in his attempt to weaken my statement that the new bell for Woburn is the heaviest parish church bell in Great Britain.

THOMAS WALESBY.

LIGHT ON THE PREMISES.

SIR,—A lady, under the impression that gas would be laid through the parish, has fitted up her house and stables with pipes and gaseliers, &c., throughout, at a great outlay; but now, certain difficulties have arisen, causing the entire abandonment of the introduction of gas into the parish. Can you or any of your correspondents recommend any safe and serviceable plan of lighting her house, either with gas or anything else, and using the pipes, burners, and gaseliers already erected, without going to the expense or having the nuisance of a gasometer, &c. on the premises. Does the portable gas answer for such a purpose? I recollect, some ten or twelve years ago, receiving a prospectus of some kind of lighting company, having offices, I think, in Bishopsgate-street, recommending some new light or new mode of burning, discovered by a Frenchman, and then used at the Jockey Club, Paris, and many other public buildings. Can it be recommended?

J. B.

A NEW "patent gas-generator" for private gasworks, &c., is thus described in the *American Gaslight Journal*:—In this apparatus kerosene or petroleum is distilled in combination with wood, and converted into a fixed gas of great purity, which gives a light superior in brilliancy and beauty to ordinary coal-gas. The apparatus consists of an elevated oil receptacle, communicating by a tube and syphon with a small retort in a common box-stove or furnace. Here the oil is decomposed by a temperature of 800° Fahr., in combination with wood, with which the retort is first charged, and the resultant gas is conducted into a condensing box, and thence to the gas-meter. The gas is free from the impurities and disagreeable odours of coal-gas, and is exceedingly simple to manufacture and prepare for use, because it requires no purification. For private residences, hotels, factories, and even small communities, this apparatus, it is added, is meeting with much success. Messrs. George H. Kitchen & Co. patentees, 591, Broadway, manufacture and put up the apparatus.

THE NEW CATTLE MARKET AT SOUTHAMPTON.

THIS market has been opened. It is bounded on the north side by Chantry-road, on the south by the Bridge-road, on the east by the South-Western Railway (close to the Dock Station), and on the west by Terminus-terrace. The area in use is about one acre, but there is sufficient land to extend it to four acres. About half of this space is devoted to cattle stalls, and the other half to sheep and pig pens. The main entrance is placed in the centre of the Terminus-terrace boundary fence, and the sheep and pig entrance in Bridge-road. There is also another entrance at the corner of Bridge-road, opposite Day's Hotel. The cattle stalls are estimated to accommodate 230 beasts, and the pens 1,180 sheep and 500 pigs. The pens for both these classes of stock being of the same size are available for either. The surface of the land has been raised to the level of the road of Terminus-terrace at one end, and 2 ft. above the old surface at the other end, thus securing thorough drainage into the main sewer. The cattle stalls are formed by means of two wrought-iron rails and cast-iron posts, 3 ft. 6 in. in height, bedded in concrete. The flooring is of concrete, coated with Portland cement, and drained into stone channelling, running the whole length of the stalls, thus securing cleanliness. The sheep-pens are 6 ft. 6 in. square, and will accommodate ten sheep each. They, too, are formed of wrought iron, with concrete flooring, coated with Portland cement, and channelled with stone all round. The pig-pens are of the same size and construction as those for sheep, the bars of which are placed much closer together, so as to safely accommodate small pigs. The whole of the works have been designed by the borough surveyor, Mr. James Lemon, and executed under his superintendence. Mr. John Cox executed the drainage, the raising and forming of the surface, and the concreting and channelling. Messrs. Hill & Smith, of Brierly-hill, Staffordshire, supplied the ironwork; and Mr. Fry, of Southampton, fixed it as a sub-contractor. The iron fencing and gates were supplied and fixed by Mr. Kent, of Southampton; and Mr. Davies and Mr. Doggrell were the contractors for the painting.

THE DRAMA.

A FEW days ago we had the satisfaction of hearing a play, "Waldeck, or the Siege of Leyden," read by the author of it, Mr. Angiolo Slous, well and widely known as the author of the first T. P. Cooke prize drama, "True to the Core," and several other successful pieces. The prize drama, by the way, added many hundreds of pounds to the funds of the Dramatic College. "Waldeck" is a very charming production, poetic and dramatic, written in a high tone that is well sustained throughout, and we cannot avoid expressing a hope that a manager may soon be found to place it properly upon the stage. It would need three actors and one actress of high class. The siege of Leyden, it will recur to our readers, which was sustained against the Spanish forces, more than 6,000 of the inhabitants dying of famine and pestilence during the investment, took place in the year 1574. The play it has given rise to is a worthy addition to the dramatic literature of the country.

STAINED GLASS.

Winslow Church.—A stained-glass memorial window has been fixed in the parish church of Winslow, Bucks, erected by Mrs. Miles, in memory of the Rev. J. Miles, B.D., late incumbent of Holy Trinity Church, Paddington. There are four lights, a subject in each, viz., The Agony in the Garden, the Crucifixion, the Resurrection, and The Ascension. The work was designed and carried out, by Mr. A. J. Mingaye, of London.

Lady Huntingdon's Church, Tunbridge Wells. A memorial window, 22 ft. high by 11 ft. wide, in the Decorated style, containing five openings, with subjects in nearly life-size figures, has been put up in this church by Messrs. William Holland & Son, of Warwick, stained-glass artists. In the three centre openings the subject of "Our Saviour blessing little Children," forms a picture, in nearly life-size figures. In side lights are—"Christ as the Tender Shepherd;" "Our Saviour placing a Child in the midst of his Disciples." And under each of the above subjects, forming the pedestals, are the following:—"Jacob blessing Joseph's Children;" "The finding of Moses;" "Eli brought to Samuel;" "The Israelitish Maid;" and "Timothy taught the Scriptures," under canopies. In the tracery are "Angels playing upon musical instruments," with smaller openings filled with Gothic ornament. The inscription states the window to be in memory of T. A. Gibb. A rose window has also been inserted by the same artists in this church as a memorial. The subject is,—"Eli and Samuel," surrounded by "Angels playing upon musical instruments," and ornament with monograms. Two smaller rose windows have also been filled with Gothic floriated ornament and monograms by the same artists.

Durham Cathedral.—A stained-glass window, designed and executed by Mr. Wailes, of Newcastle-on-Tyne, has been fixed in the north aisle of this cathedral. The window has been provided at the cost of Mrs. Maltby, as a memorial of her husband, the late Canon Maltby. It is divided into three circular medallions, each one being filled with figures, and surrounded by conventional foliage; while round the whole runs a border composed of the Norman zigzag and leaves. The subjects in the medallions are as follow: in the upper one is represented Our

Lord in three characters,—in the centre as a Good Shepherd, bearing in his right hand a pastoral staff, and in his left a lamb; on the right he is leading a young child by the "still waters of comfort," and on the left guiding him through the "valley of the shadow of death," shown by a lion and serpent ready to devour him; in the centre circle Our Lord is represented holding a little child, "For of such is the kingdom of heaven;" the third and lowest medallion shows Our Lord giving His people into the charge of St. Peter. Across the bottom of the window is an inscription, "To the glory of God, and the memory of Henry Joseph Maltby, canon of this cathedral, and his sons, Charles Bradford and Ralph Howard. He departed Nov. 24th, 1863.

Horspath Church (*Oxford*).—The east window of this pretty little church has just been filled with stained glass at the cost of the Rev. H. R. Bramley, Fellow of Magdalen College. The style of the window is Perpendicular, and consists of three openings and tracery. The subject is the Crucifixion, in the centre our Lord on the Cross, with Mary Magdalen kneeling at the foot; and the side openings are filled with the Marys, St. John, and Salome. The group is surmounted by a canopy. In the tracery are depicted figures of St. Frideswide, St. Giles, St. Mary Magdalen, and St. John the Baptist. The window is the work of Mr. G. Baguley, of Newcastle-on-Tyne.

SCHOOL-BUILDING NEWS.

South Shields.—The newly-erected day-schools in connexion with St. Mary's Church, South Shields, have been opened. The building is constructed of red press bricks, with fire-brick facings. The school is situated at the head of Dock-street, Tyne Dock, and is within a few hundred yards from the church. The building is divided into three departments—girls', boys', and infant school-rooms. The entire length of the front of the school is 130 ft., by 60 ft. in depth. The height in the interior is 17 ft. from floor to ceiling. The roof is open timbered. There are three separate play-grounds, with laboratories, drinking-fountains, &c. The school-rooms are lighted with gas. The origin of the schools is due to the North-Eastern Railway Company, who contributed the sum of 1,213*l.* 6s. 1d. towards their erection. A large number of their workmen are located in the neighbourhood of Tyne Dock. The plot of ground on which the schools have been erected was presented by the dean and chapter of Durham and Mr. Ald. Williamson. The architect of the North-Eastern Railway, Mr. Prosser, designed the building, and gave his services gratuitously, Mr. Thomas Robson, South Shields, was the builder; Mr. J. Hall, the plumber; Mr. Edwards, the painter; and the ironwork was done by Mr. Hepple, of Gateshead. The estimated total outlay is 2,940*l.* 2s. 6d.

Newcastle.—The New British Schools, Tyne Dock, and also St. Mary's Church schools, have been formally opened. Both institutions are indebted to the North-Eastern Railway Company for assistance in the shape of money and of the gift of the ground. Of the 1,210*l.* collected, however, the workmen of the company themselves have contributed 230*l.* The Government have agreed to grant 588*l.*, making a total of 1,798*l.* collected. The building and fittings will cost 2,250*l.* The schools are designed in the Mediæval character, freely treated, without pretensions to ornamental details. An effect is obtained by the use of fire-bricks around the windows, doorways, and chimneys, in contrast with the red bricks of the walls. The plan of the building is nearly the form of the letter H, the boys at one end, the girls at the other, and the infants in the centre. Mr. T. Prosser, of Newcastle, was the architect; Mr. J. Scott, clerk of the works; Mr. R. Bates, the builder; Mr. J. G. Weir, the painter; Messrs. Walker & Emley, Newcastle, the plumbers; and Mr. Thomas Coulson the glazier.

Stockport.—The contract for the erection of a building in the Market-place, on the proposed site of the Bank of Stockport, has been let to Messrs. J. & J. Longson, of Stockport, from designs prepared by Mr. T. A. Allen, of Stockport, architect. It will command two fronts, one to the market and the other to the Underbank Bridge. The building, which is in what is called the Grecian-Italian style of architecture, will be four stories high, including the basement, having a stone front up to 25 ft., the remainder being finished with stone dressings, enriched with stone pilasters and ornamental caps and moulded bases, cornice, and blocking stone, and decorated cantilevers underneath. There will be six windows looking into the Market-place, and sixteen to the bridge, the main entrance being from the bridge, each side of the doore being supported by polished Aberdeen granite shafts, with carved Corinthian capitals, and a representation of the borough arms. The door opens into a vestibule, 8 ft. wide, the directors' room, 18 ft. by 16 ft., being on the left. The banking-room, which will be lofty and commodious, will measure 40 ft. by 25 ft. The ceiling will be arranged in panels.

Heckmondwike.—Alterations in the way of paving the market-place, laying new causeways, building a market-house and weigh-house, and several other conveniences in connexion with the market here, have taken place from time to time, but the new market is now complete, and a movement is on foot for the opening ceremony. Three triumphal arches are to be erected at the three entrances into the town, and the directors of the gas company have decided to supply gas gratis for the illumination of the market. Prizes are also to be given for the best show of butchers' meat, vegetables, &c.

Books Received.

Book of Designs for Mural and other Monuments. JAS. FORSYTH, Sculptor. 3rd Edition.

IN this new issue of Mr. Forsyth's book the designs have been revised and drawn on stone by Mr. R. K. Thomas. In the preface to it the sculptor acknowledges the assistance of various architectural friends in the preparation of it. We should prefer to find the designer of each monument named. Mr. Norman Shaw, Mr. W. Smith, and Mr. R. H. Carpenter are amongst those, as we understand from Mr. Forsyth, who have contributed to the collection. It is the best work of the kind that we know of.

VARIORUM.

MESSRS. DEAN & SON have published "Debrett's Illustrated Peerage," and "Debrett's Illustrated Baronetage, with the Knightage," for the present year. The Peerage claims to be the oldest handbook extant relating to the upper classes. Containing, as is asserted, 200,000 facts, its general correctness must be deemed remarkable. Through these works, says the editor, with justice,—

"We learn of our public men, their seats, residences, and clubs, their marriages, their place of education (with University degrees), their children, their Church patronage, their services, their appointments in the army, navy, learned professions, and every particular of interest."

——Mr. Hardwicke sends forth his "Shilling Peerage," "Shilling Baronetage," and "Shilling Knightage," for the year, and also publishes the three together in a smart little volume, under the title of "Hardwicke's Crown Peerage for 1868." The fact that these are compiled by Mr. Edward Walford, M.A., is sufficient to assure us of their general correctness.

Miscellanea.

LIVERPOOL WATER SUPPLY: THE BALA LAKE SCHEME.—The idea of obtaining a water supply for Liverpool from Bala Lake is still favourably entertained by many of the local council. At a recent meeting of the Water Committee of the Town Council several members expressed the opinion that instead of spending 160,000*l.* on additional works at Rivington and on works at Dudlow-lane, it would be much more advisable to obtain powers to spend from 2,000,000*l.* to 3,000,000*l.* upon a scheme to obtain water direct from Bala Lake, in order that the supply to Liverpool might be continuous both for present and future wants. After some discussion, the chairman stated that they were bound to proceed with the works sanctioned by the council; and that if economy were exercised, and the present system of water-closets recommended by the council were not "pushed too far," there might be a sufficient supply from existing sources for the next twenty years. During the last two or three years the rain-fall at Rivington had been very slight in comparison with that in the districts of the Ribble and the Lune.

THE DISCOVERIES IN PALESTINE.—In a lecture on this subject at the Crystal Palace last week by the Rev. Chas. Boutell, the lecturer said a letter had just been received from Lieutenant Warren, in which he announces that he has discovered two new arches of 14 ft. span to the west of the two arches of 23 ft. span west of Wilson's arch, and also a long vaulted passage leading towards the Yaffa gate. He has traced this for 120 ft., the masonry being carefully hewn. A flight of steps has been discovered at the Bir Eyûb, and a new tank north of Robinson's Arch.

THE IMPROVEMENTS AT LUDGATE-HILL.—On Tuesday the Commissioners of Sewers held a meeting at Guildhall. The clerk read a letter from the Metropolitan Board of Works, stating that they had voted in aid of the Mansion House improvement the sum of 7,354*l.*, and in aid of widening the west end of Ludgate-hill the sum of 11,756*l.* A long discussion ensued as to the propriety of setting back several houses on the south side of Ludgate-hill, and it was eventually resolved that, having regard to the importance of the improvement contemplated, notice be immediately given, under the powers of the Act of Parliament, to take the whole of the premises and property connected therewith at such a sum as a jury may award, for the purpose of continuing the improvement on Ludgate-hill.

THE UNWHOLESOME STATE OF COURTS OF JUSTICE.—It is strange that the frequent complaints of Judges as to the state of the Courts in which they are called upon to sit are so little heeded. Mr. Justice Mellor, who presided over the civil side of the Northumberland assizes, has been complaining sorely of the state of the Court-room in the Moot-hall, Newcastle. About an hour after the opening of the assize, his Lordship said he should be obliged to adjourn the Court. He was nearly suffocated, and was badly seated. His desk was so far from his chair that he had to lean forward to take his notes, and the Court was overpoweringly hot from the steam, which rose directly under his feet! It was perplexing to have to attend to a case while suffering the abominable inconvenience of being half-baked. He had before made the same complaint, and unless the county magistrates made the place suitable for holding the business, he should have either to stop the business or to adjourn to another place. He should fine both the under-sheriff and the county surveyor if something were not done.

SALE OF THE BRIGHTON WORKHOUSE ESTATE.—The most valuable portion of the old workhouse site has been sold by auction. The ground being restricted to the erection of villas, the sale-rooms were well attended by both private and speculating purchasers, the latter predominating; and, with the exception of three lots out of twenty submitted, comprising thirty-eight plots, the whole was knocked down to the "trade." This was the only opportunity of obtaining land for villas in the centre of the town and away from the bustle of business. The situation is about the highest point of Brighton, commanding a view of the sea, the Downs, and the town; it is in close proximity to the railway and parish church; and abuts on to one of the principal pleasure rides and drives in the borough, namely, the Dyke-road. The sales were all *bonâ fide*, the reserved price being exceeded in each case, and the aggregate amount realized was 1,000*l.* above the estimated value. The principal lot in the sale is situated at the corner of the Dyke-road, where the latter is intersected by Buckingham-road and Powis-grove. It has a frontage in the Dyke-road of 67 ft., and in Buckingham-road of 92 ft., being 79 ft. 3 in. in width at the east end, with an average depth of about 95 ft. The first offer was 650*l.*, and, after some lively bidding in 10*l.* advances, Mr. George Attree, auctioneer, North-street, became the purchaser at 800*l.* With the exception of two single plots, two houses may be built on the several lots, of the value of 600*l.* each, but not more than two; but it is at the option of the purchaser to build one only, provided that it be of the value of 1,000*l.* The total amount realized was 12,125*l.*, being nearly 3,000*l.* over the sum obtained in either of two previous sales. By the first sale, 8,755*l.* were obtained, and 9,465*l.* by the second; making an aggregate, with 1,179*l.* for the old buildings, of 31,524*l.* already realised for this land, verifying the calculations made by the guardians, that the parish would get its new workhouse for nothing: and the land is not yet all disposed of.

ARCHITECTS' BENEVOLENT SOCIETY.—We would direct attention to the circumstance that the annual meeting of this useful society will be held in the Rooms of the Institute, 9, Conduit-street, on Wednesday, the 11th instant, when it is hoped members and friends will attend numerously. The society is scarcely supported to the extent desirable.

THE HAMMER OF HAMMERS.—M. Krupp is about to construct at his works at Essen (Prussia) a single-acting steam hammer, far exceeding in size any now in existence. The design for this hammer—which will have a head weighing 129 tons—has already been prepared, and the patterns are now in hand. At present, the largest steam-hammmer at M. Krupp's establishment is one with a 50-ton head, falling 9 ft. 6 in.

FATAL ACCIDENT AT A MANCHESTER BRICK-KILN.—The Manchester city coroner has held an inquest on the body of a young man who was engaged in getting bricks from a kiln, at the brickyard of Messrs. Johnson & Livesey, at Gorton, when a number of bricks fell upon him, and he sustained such severe injuries that his death resulted in the Infirmary on Saturday. A verdict of "Accidental death" was returned.

MORE FEVER AT THE MAURITIUS.—A regiment has just been thrown into a terrible fever at the Mauritius, because, as is asserted, the colonel was disinclined to undergo the inconvenience and discomfort of a return voyage to the Cape. The general and medical officers at the station remonstrated against the landing; but the colonel's convenience and comfort gained the day. The men were landed, and fever soon crept amongst them. The number of cases was increasing when the last mail left. The case has been mentioned in Parliament, and Sir J. Pakington, Secretary of War, held that the landing was reprehensible.

GAS.—The Belper Gas Company have declared their usual dividend at the rate of 10 per cent. per annum.——There is a strike at Malmesbury against the price of gas. The price charged is 6s. 8d. per 1,000 cubic feet: the consumers say it ought not to be more than 5s., and to bring the Company to terms they have reverted to the use of lamps and candles. —— The Sudbury Paving and Lighting Commissioners have agreed to reduce the price of gas 9d. per 1,000 (from 6s. 3d. to 5s. 6d.), and make a further reduction of 6d. per 1,000 as soon as the consumption is increased from 6,000,000 to 7,500,000, without the public lamps. The great majority of the gas consumers have engaged, it seems, to take gas for five years of a new company at 4s. per 1,000 ft., and it is believed the reduction to 5s. 6d. will not satisfy them. A practical engineer had offered to produce gas at 4s. 6d. per 1,000 ft., and give the shareholders of either the old or new company six per cent. Mr. Burke, of the Auberies, who is chairman of the Imperial Gas Company, is about to erect new works for his house, and says the gas, after allowing interest of outlay and all other charges, will only cost him 4s. per 1,000 ft.

RESTORATION OF CHESTER CATHEDRAL.—Estimates have been obtained from Mr. Christian and Mr. Scott, of the cost of repairing and restoring this edifice, as follows:—Necessary repairs, 22,531*l.*; desirable repairs, 7,000*l.*; improvements, 20,000*l.*; total, 49,531*l.*; add architect's commission, 5*l.* per cent. (2,500*l.*), 52,031*l.* The "desirable repairs" include flying buttresses, restoration of cloisters, King's school, and bottom stage of west Norman tower, with lead instead of slate on the roof. The "improvements" include stone groining of the nave and aisles, restoration of the tower and spire, internal cleansing and repair, and complete restoration of the choir. No special fund is provided by the foundation or the Ecclesiastical Commissioners, for repairs or other contingencies. The Dean and Chapter have usually set apart from 300*l.* to 500*l.* annually for this object. By this means a sum of nearly 1,800*l.* had been accumulated in the course of ten years, which it had been intended to apply to the restoration of the fabric. It has, however, been applied to the purchase of the new bells, 500*l.*; to the warming of the cathedral, 500*l.*; to the fittings of the nave and other expenses connected with the special evening services. The entire cost of these has been 2,100*l.*, so that there is a deficit on this head of 600*l.*, to be met out of the annual revenue of the chapter. There is now no fund for the restoration or repair of the cathedral building.

NUISANCES.—A nuisance against which the Court of Chancery will grant an injunction must be a material injury to property, or to the comfort of the existence of those who dwell in the neighbourhood. This was the holding of the Court of Appeal (reversing a decision of Vice-Chancellor Stuart) in the case of Luscombe *v.* Steer, where it was remarked by one of the Lords Justices, that in such cases as these, the recovery of a verdict at law does not necessarily entitle the plaintiff to an injunction; but the fact that there is legally and technically a nuisance must be considered, together with the amount of damage, and the duration of the nuisance complained of.

LONDON LABOURERS' DWELLINGS SOCIETY.—At the thirteenth half-yearly meeting of this society, held last week, the directors presented their report for the six months ending December 31st, and the usual dividend at the rate of 5 per cent. per annum, free of income-tax, was declared. The capital of the society now amounts to 31,900*l.*, the sinking fund (for the redemption of the leasehold property of the society) to 927*l.* and the reserve fund (for the equalization of dividends, or extraordinary expenses) to 3,987*l.* of which sum 1,500*l.* are deposited at interest in order to provide the means of purchasing temporarily at par any shares that a member may from unforeseen circumstances wish to realize.

THE AMALGAMATED SOCIETY OF CARPENTERS AND JOINERS.—Mr. Hughes, M.P., presided on Wednesday evening at a meeting held in the Arundel Hall, Arundel-street, convened by the Amalgamated Society of Carpenters and Joiners, "for the purpose of presenting the accident benefit of 100*l.* to each of two members of the society who, through affliction, have been rendered incapable of following their employment for life." The Chairman said, they were aware the principles of trade societies were being inquired into by a royal commission, and if they had been called together to consider the question of trade unions, it would not have been proper for him to preside that evening. The questions involved in trade unions they would not go into that evening. They were present for the purpose of presenting 100*l.* to two of their members, that sum being the reward of their providence. One of their members (George Burford) was a resident in the borough he had the honour to represent. Whatever the action of trade unions had been, societies like the Amalgamated Society of Carpenters and Joiners had done a great deal of good for the working classes in the hour of need.

TENDERS.

For villa residence to be erected upon the Albert Park, Abingdon, for Mr. E. Harriss. Mr. Edwin Dolby, architect. Quantities not supplied:—

Dover	£1,300	0	0
Thomas	1,088	0	0
Selby (accepted)	1,026	0	0

For two villa residences, Wilmslow, Cheshire, for Mr. John Beaumont. Messrs. Picton, Chambers, & Bradley, architects. Quantities supplied:—

Bowden & Edwards	£3,345	0	0
Neill & Sons	3,320	0	0
Gothard	3,300	0	0
Thompson	3,275	0	0
Hughes	3,100	0	0
Royle & Mellor (accepted)	2,980	0	0

For erecting a dwelling-house and shop in Old-street, St. Luke's, for Mrs. Brain. Mr. Thomas J. Hill, architect:—

Chessum	£1,167	0	0
Rivett	1,093	0	0
Moreland & Burton	1,085	0	0
Perry	1,031	0	0
Henshaw	1,020	0	0
Ennor	971	0	0
Sabey	931	0	0

For alterations to White Horse Tavern, Fann-street, City. Mr. Thomas J. Hill, architect:—

Deer	£340	0	0
Foale	335	0	0
Perry	330	0	0
Corbeldick	301	0	0
Fagg	257	0	0

For new warehouses and offices, No. 61, Coleman-street, for Mr. Charles Titterton. Mr. G. J. Loe, architect. Quantities supplied by Mr. T. R. Nixon.

Colls & Co.	£2,150	0	0
Adamson & Son	2,137	0	0
Axford & Co.	2,100	0	0
Hart	2,090	0	0
Rider & Son	2,087	0	0
Winder	2,077	0	0
Gammon & Son	2,071	0	0
King & Sons	2,060	0	0
Wells	2,030	0	0
Hill & Keddell	2,025	0	0
Conder	2,022	0	0
Wills	1,978	0	0
Crabb & Vaughan (accepted)	1,848	0	0

For new stabling, Avenue, Gipsy-hill, Lower Norwood, for Mr. J. W. Skelton. Mr. G. J. Loe, architect:—

Crabb & Vaughan (accepted)	£320	0	0

For alterations and additions to Bower Cottage, Kentish Town, to adapt the same as a Relief Office for District No. 1, and a Labour-yard for the Parish of St. Pancras. Mr. E. C. Robins, architect:—

Waters	£2,400	0	0
Keeble	2,300	0	0
Palmer	2,190	0	0
Brass	2,097	0	0
Abbott	2,090	0	0
Till	2,054	0	0
Heming	2,026	0	0
Crockett	2,000	0	0
Newman & Mann	1,996	0	0
Crabb & Vaughan	1,990	0	0
Ball	1,988	0	0
Nightingale	1,973	0	0
Lathey, Bros.	1,970	0	0
Kelly, Bros.	1,853	0	0
Mann	1,840	0	0
Nutt & Co.	1,790	0	0
Scrivener & White	1,789	0	0
Manley & Rogers	1,782	0	0
Sharpington & Cole	1,777	0	0
Thomas & Son	1,735	0	0

For erecting a pair of semi-detached villas, at Hitchin, for Miss Hall. Mr. J. Shilcock, architect:—

Butterfield	£749	0	0
French	735	0	0
Jeeves	731	0	0
Stapleton	719	0	0
Ansell	672	0	0
Allen (accepted)	670	0	0

For alterations to 55, Old Broad-street, City, for Messrs. Somes, Mullens, & Co. Mr. Woodcock, architect. Quantities supplied by Mr. G. Evans:—

Johnstone & Jeanes	£1,935	10	6
Gammon & Son	1,597	0	0
Carter & Sons	1,570	0	0
Piper & Wheeler (accepted)	1,524	0	0

TO CORRESPONDENTS.

Agricultural Hall, Walsall.—The architect is Mr. G. B. Nichols.

W. F.—J. H.—H. T.—Dr. H.—P. & Co.—I. G.—R. J. W.—P. & K.—N. A. H.—C. P.—J. P. P.—B. W.—W. H. S.—J. B.—T. E.—T. H.—Lieutenant M.—G. B.—A. M.—R. E.—G. H.—L. E.—J. S.—R. W. E.—F. E. W.—J. H. O.—M. H.—G. W. S.—J. S.—H. L.—G. D. H.—A. N. Bricklayer.—Ex Land-Agent.—F. E. H.—W. B.—A. P.—Messrs. D.—T. J. H.—G. J. L.—H. B. (consult a proper person on the spot).—J. B. (next week).

NOTE.—Architects who are unwilling (as we are) that their names should not accompany lists of tenders with which they are concerned, may prevent the omission by sending lists themselves. We cannot repeat lists on the ground of such omission.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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[ADVERTISEMENTS.]

CHURCH, TURRET, and STABLE CLOCKS. J. W. BENSON, having erected steam-power and improved machinery for clock-making, at the Manufactory, Ludgate-hill, will be glad to furnish to clergymen, architects, and committees, Estimates and Specifications of every description of Horological Machines, especially cathedral and public clocks, chiming tunes on any number of bells. A descriptive pamphlet on Church Clocks post free for one stamp. Watch and Clock Maker by Warrant of Appointment to H.R.H. the Prince of Wales, and maker of the great clock for the Exhibition, 1862. 25, Old Bond-street, and 33 & 34, Ludgate-hill, E.C. Established 1749.